SEPTEMBER, 1955

American Engineer

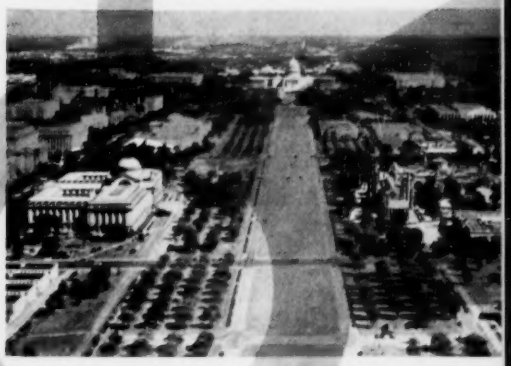
IN THIS ISSUE . . .

• **We Must Plan Our Cities**

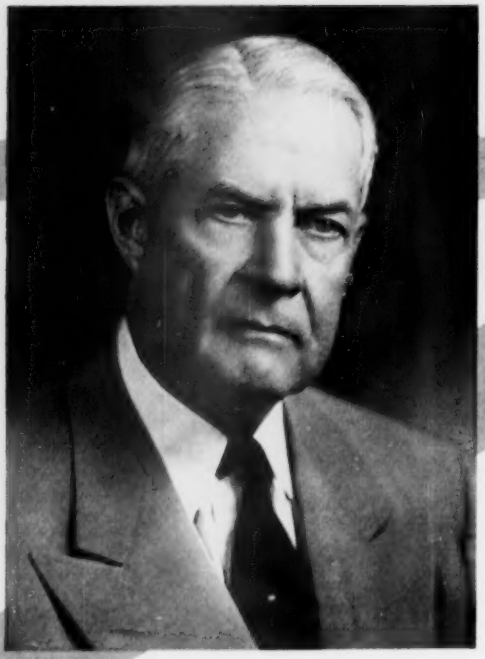
By

MAJ. GEN. U. S. GRANT, III.

President, American Planning and Civic Association



Maj. Gen. U. S. Grant, III



The Role of the Technician in our Nation's Future by Karl O. Werwath, P. E.

For a Profession Ethics are the Prime Essential by Dean Clement J. Freund

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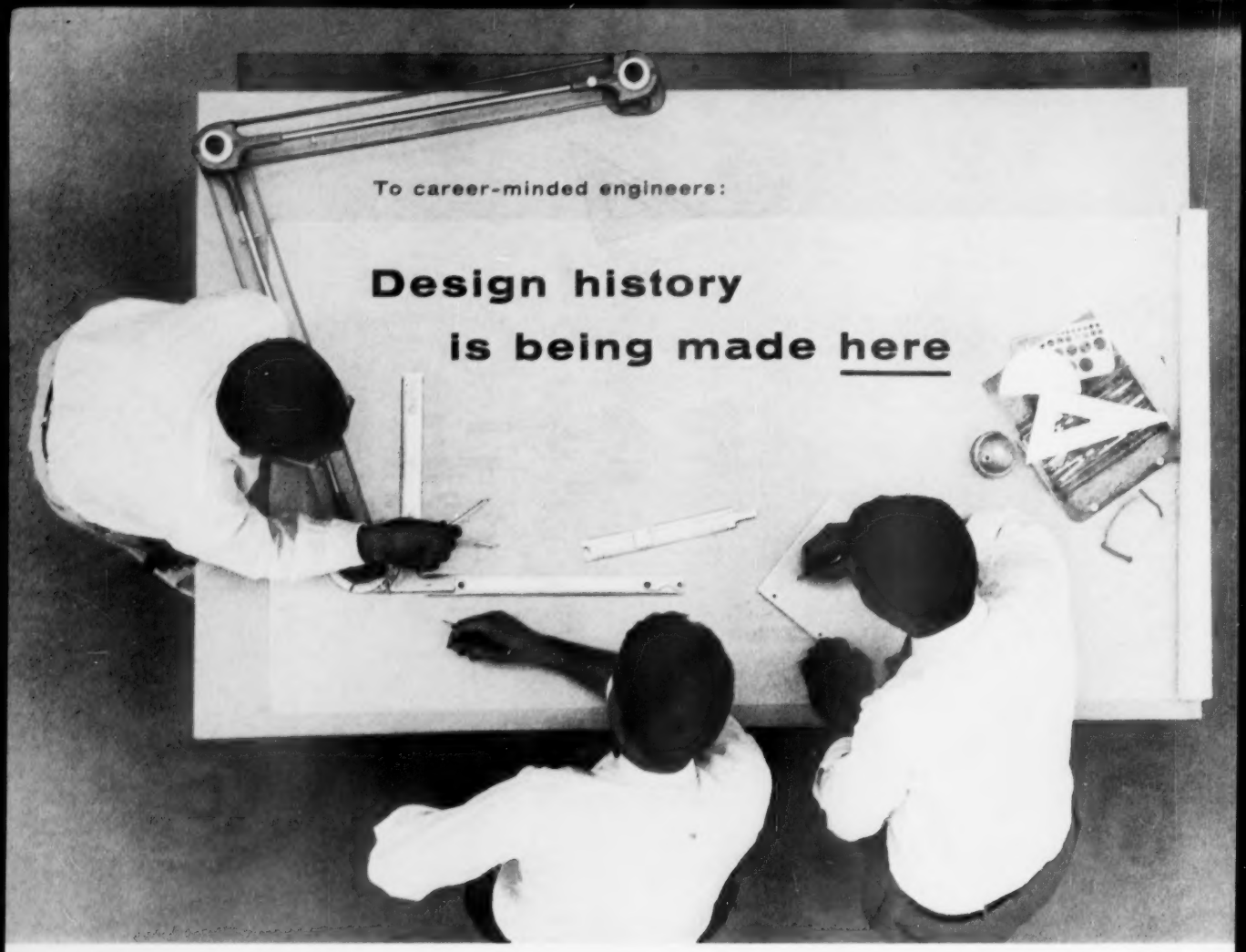

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Lockheed's expanding Design program has created positions at all levels in mechanical, electrical, hydraulic, power plant, controls and structures fields. A brochure describing life and work at Lockheed will be sent you upon request. Address E. W. Des Lauriers, Dept. DH-2-9.

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American Engineer

SEPTEMBER

1955

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•

. . . I know of no safe depository of the ultimate powers of the society but the people themselves.

—THOMAS JEFFERSON

•

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Karl O. Werwath, P. E., President, Milwaukee School of Engineering. Here, at last, is information by an expert on this neglected topic.

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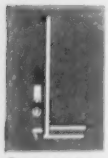

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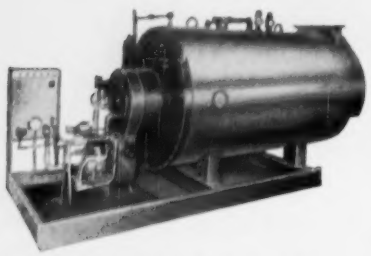

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Letters to the Editor

RCA Strike . . .

Dear Editor:

In regard to your short article in the July issue of the AMERICAN ENGINEER headlined, "RCA Engineers Hold 45-Minute Strike," I would like to say that our last issue of the *Exponent* carried the terms of the Association's contract settlement with RCA.

I would like to point out that there was one point of misinformation in your article. Our Association represents only research, design and development engineers of the Radio Corporation of America. Neither technicians, nor draftsmen are included under our contract.

We would appreciate a correction of the impression given by your article.

JOHN P. MORAN,
Corresponding Secretary,
Association of Professional
Engineering Personnel, ESA,
Camden, N. J.

► Terms of the settlement, which were announced in the *Exponent*, include a 9 per cent salary increase this year and 4 per cent in June, 1956, plus several non-economic adjustments. The reference to "technicians" in our story was based on two independent local news sources which referred to a ". . . strike of engineers and ranking technicians . . ."—*Editor*.

A(d)verse? . . .

Dear Editor:

Besides thanking you for publishing my letter, captioned "More Designations," on pages 4 and 5 of the AMERICAN ENGINEER for August, I should like to note two departures from the text of my letter.

In the paragraph ahead of the tabulation, *adverse* should have read *averse*. The meaning is clear enough but the usage is poor; perhaps it was a typographical slip. (1.)

In that same paragraph, *four of the* founder societies should have read, *the four* founder societies. There were four, no more, and they jointly established the enterprise that resulted in the United Engineering Societies Building at 29 W. 39th St., New York, some fifty years ago. (2.)

At the present time, the five major engineering societies are regarded as the four founders, listed in my letter, plus the AIChE. I assume it was this which caused you to modify the wording—but the AIChE was not a "founder."

ROBERT F. WOOD, E.M.
Washington, D. C.

► (1.) We slipped. (2.) The "founder societies" were organized as follows: Civil Engineers, 1852; Mining Engineers, 1871; Mechanical Engineers, 1880; Electrical Engineers, 1884; Chemical Engineers, 1908. Metallurgical Engineers were added to the Mining Engineers in 1919.—*Editor*.

A Matter of Ethics . . .

Dear Editor:

Prior to my recent term of office as city attorney of Grand Rapids, Michigan, I had very little acquaintance with consulting and practicing engineers, or for that matter with any engineers. During the period of my incumbency, however, I learned much concerning the activities of such professional men.

I have noted the competitive rivalry, accompanied by the overtones and innuendoes of name-calling and unfair criticism which seems to exist among professional engineers.

It has occurred to me that when a good and recognized firm of professional engineers has been retained to design and supervise a particular project, other engineers should refrain from unsound criticism of the project, and most certainly should abstain from efforts to supplant the aforesaid designing and supervising engineer.

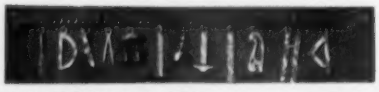
As a result of that experience, I have had occasion to study an engineering Code of Ethics. If I read the Code correctly, it is not improper for one engineer to succeed another if the services of the other have been terminated. But that would assume that the termination has been legal, ethically proper and for good cause. Certainly no self-respecting engineer should play any part in the termination of the services of another man, particularly if the services of the latter were obtained on the basis of a valid continuing form of contract for professional services, or if the services of the latter have not been paid for in full.

It is my feeling that until such contract has been terminated in correct legal manner and in full compliance with ethics accompanied with proper payment in full, there should be no competition to supplant the holder of the contract on the part of professional engineers.

The Code of Ethics of the American Society of Civil Engineers, Section 6, provides that it is unprofessional "to review the work of another engineer for the same client except with the knowledge *or* consent of such engineer, or unless the connection of such engineer with the work has been terminated." I have already adverted to the word "terminated." But it seems to me that this provision still is lamentably weak, and made so by the use of the disjunctive "or," above italicized. All that one engineer has to do is to make it known to the retained engineer that the former will review the work. Under the phraseology of this section, "consent" is not necessary, and its inclusion here is seemingly meaningless.

I should very much like to hear from

(*Continued on page 49*)



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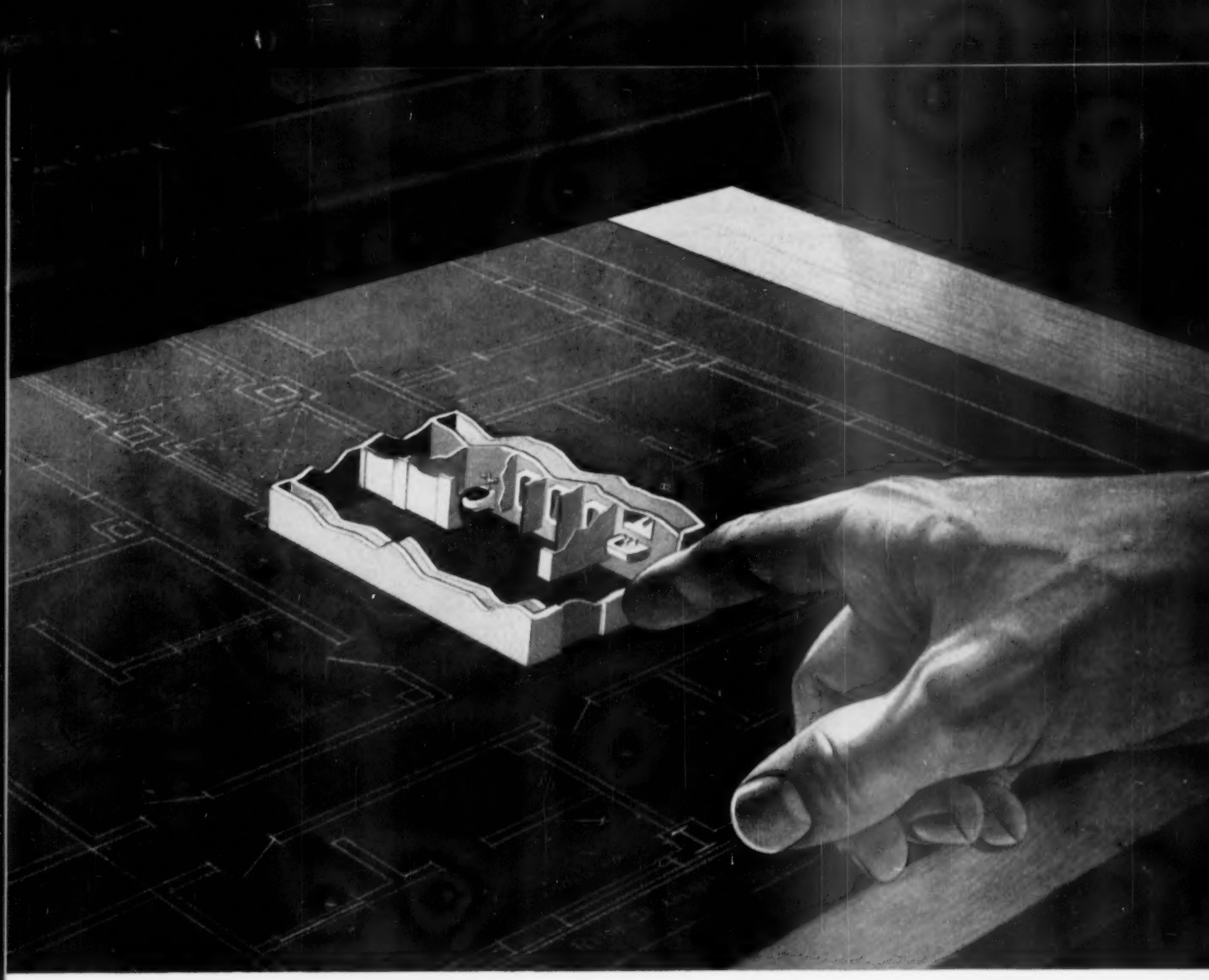

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PROFESSIONAL NEWS IN CAPSULE FORM

A Roundup of Late Events for Professional Engineers

Dean Stapley Retires

September 1 has been announced as the retirement date for Edward R. Stapley, dean of the Oklahoma Institute of Technology of Oklahoma A&M College, after a 41-year career in engineering and education. According to A&M President Oliver S. Wilham, he will now become dean emeritus of the Oklahoma Institute of Technology and professor emeritus of civil engineering.

Dean Stapley, who is a prominent member of the Oklahoma SPE and NSPE, is a native of New York State and a graduate of Cornell University. He received a degree in civil engineering from the latter school in 1914 and an M.C.E. degree in 1930; he also holds a Master of Science degree in sanitary engineering from Harvard.

He has served on the A&M faculty in various capacities for thirty years and has headed the engineering division as dean or acting dean since 1942. He started the school's graduate engineering program, and the Ph.D. degree in engineering was first offered by Oklahoma during his deanship. He also developed A&M's School of Technical Training which provides two-year terminal instruction in eleven different fields for approximately five hundred students annually.

Dean Stapley also is given credit for establishing the A&M Engineering Extension Division and activating the school's Enginering Experiment Station. In addition, he initiated the college's Industrial Advisory Board of thirty civic, business, and professional leaders.

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Seeger in Education Post

Edwin W. Seeger of Milwaukee, Wisconsin, a past vice president of the National Society of Professional Engineers, has been elected chairman of the Board of Regents of the Milwaukee School of Engineering.

Mr. Seeger is vice president and assistant secretary of Cutler-Hammer, Inc., having been associated with the firm in various capacities since his graduation from Ohio State University in 1913. He was first elected a member of the Milwaukee School of Engineering Corporation in 1951, previously having been a member of the school's Industrial Advisory Committee.

He holds over 100 patents on electromagnetic devices and is the author of many articles which have appeared in the technical and professional press. In addition to his NSPE membership, he is a past president of the Wisconsin SPE, a national director of the AIEE, and the holder of the University of Wisconsin's Distinguished Service Citation and the Engineers' Society of Milwaukee's "Engineer of the Year" Award for 1953.

Mr. Seeger is also active in many civic organizations and is vice president and a director of the Wisconsin Chamber of Commerce.

"Aw, come on—I've turned in good work before!"

Stanford Is One of Capitol Hill Engineers

Alan G. Stanford of Robert & Company, Atlanta, Georgia, a past president of the National Society of Professional Engineers, has been named as one of a group of engineers and architects who will work under the direction of J. George Stewart, architect of the Capitol, in the design and construction of the third House Office Building and several related Capitol Hill projects.

Others in the group named by the House Office Building Commission, headed by Speaker Rayburn, are: John Harbeson, William J. Hough, William H. Livingston, and Roy Larsen, Philadelphia; Jesse M. Shelton, also of Robert & Company, Atlanta; Roscoe De Witt and Fred L. Hardison, Dallas; and Alfred E. Poor and Albert H. Swanke, New York.

"A-Bomb and Industry" Conference Is Set

Announcement has been made of the scheduling of a conference on in-

dustrial preparednes for November 17 in Chicago under the sponsorship of the Armour Research Foundation of the Illinois Institute of Technology. "The A-Bomb and Industry—A Prescription for Survival" is the theme of the conference which is expected to attract several hundred Midwest industrialists to the Tech campus.

Raymond W. Sauer, supervisor of the Foundation's structural research group, is chairman of the conference. Subjects to be covered at the meeting include: protection possibilities, including dispersion of industry, underground construction, and strengthening existing buildings; industry operation under emergency conditions; protection construction in designing new buildings; and the amount of money that should be spent for industrial protection.

Sanitary Engineering Group Is Organized

Announcement has been made of the organization of the Conference of Federal Sanitary Engineers as a means of bringing together engineers engaged in the sanitary engineering profession (including industrial hygiene) within the Federal Government.

Specific aims of the Conference will be to: support the proposed Intersociety Certification Board in Sanitary Engineering; seek the solution of mutual problems, such as recruitment, training, and career development of engineers in the U. S. Government service; and collaborate with existing professional and technical societies.

Membership is open to any sanitary engineer (as defined by the National Research Council) who is on active duty as a commissioned officer of the Army, Navy, Air Force or U. S. Public Health Service, or who is a civilian employee of any department or agency of the U. S. Government. Inactive duty reserve officers and former employees may become associate members, and retired personnel are eligible for honorary membership.

It is planned that regional meetings of the Conference will be scheduled to coincide with the annual meetings of other major interested organizations, and a special Award of Merit is also to be established for presentation each year to an outstanding sanitary engineer in Federal service.

Full information and membership applications may be obtained from the secretary of the Conference: Lt. Col.

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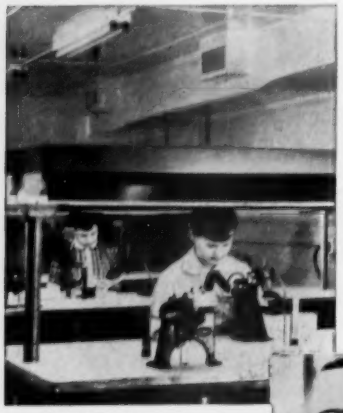

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Gordon McCallum is serving as president pro tem of the new society.

❁

ASME Diamond Jubilee

The American Society of Mechanical Engineers will hold its Diamond Jubilee Annual Meeting in Chicago, November 13-18, at the Congress, Conrad Hilton, and Sheraton-Blackstone Hotels, according to an announcement from the organization's headquarters in New York. Special features commemorating ASME's 75th anniversary have been planned for the six-day event, which will also mark the 25th anniversary celebration of the American Rocket Society, an ASME affiliate.

Five major engineering awards will be conferred during the conference. They are: the Hoover Medal to Charles F. Kettering; the John Fritz Medal to Philip Sporn; the Elmer A. Sperry Award to William F. Gibbs; the Henry L. Gantt Memorial Medal to Walker L. Cisler; and the Daniel Guggenheim Medal to a recipient as yet unannounced.

❁

Uhl Named AIEE Fellow

William F. Uhl, president of Charles T. Main, Inc., Boston, Massachusetts, and a member of the MSPE and the National Society, has been named a fellow of the American Institute of Electrical Engineers. Mr. Uhl, who is active in many other professional societies, was cited for "his contributions to the development and design of hydroelectric plants."

In addition to being president of Charles T. Main, Inc., he is also a managing partner in Uhl, Hall, and Rich, a firm in charge of all engineering for United States interests in the St. Lawrence River Power Development.

Also namd an AIEE fellow was A. R. Nelson of Upper Montclair, N. J., general superintendent of distribution, Elecrtical Department, Public Service Electric & Gas Company, Newark. He was cited for his "engineering and administrative achievement in the over-all guidance of the continued development and expansion of the nation's largest transmission and distribution system."

❁

Two Short Courses Announced

The Society of Industrial Packaging and Materials Handling Engineers has announced that its 1955 Short Course will be held September 19-21 at New York University's College of Engineering. Plans for the course have been developed by a committee headed by Dean Wilbur McKee of the University and Allyn C. Beardsell of Container Laboratories, Inc. Subjects to be covered will include: an intensive review of the basic technical principles used in packaging and materials handling, a survey of modern application of these principles, a summary of recent developments in the field, and reports on research projects now under way. There will also be a one-day session relating the operations of packaging and materials handling engineers to the other departments of an industrial organization and a one-day conference on consumer packaging and its importance to modern merchandising.

The First National Prestressed Concrete Short Course has also been announced by the Prestressed Concrete Institute and the Department of Civil Engineering of the University of Florida. The course, which is scheduled for October 10-12, will be held at the Maritime Base, St. Petersburg, Florida. Full details are available from the University in Gainesville, where A. M. Ozell is acting as supervisor of the course.

ASCE Award to Georgia Tech Professor

The J. C. Stephens Award of the American Society of Civil Engineers will be presented to Dr. Marion R. Carstens, associate professor of civil engineering at the Georgia Institute of Technology.

The award, made by the ASCE Board of Direction on recommendation of the Hydraulic Division, will be presented to Dr. Carstens during the Society's annual meeting in New York in October.

❁

Ligon Heads Clay Pipe Group

Elmer R. Ligon, director of research for the W. S. Dickey Clay Pipe Manufacturing Company, Pittsburg, Kansas, has been elected president of the National Clay Pipe Research Corporation. Other officers are: Roderic Antrim, Pacific Clay Products Company, Los Angeles, vice president; J. W. McClave, Peerless Clay Corporation, Toronto, Ohio, secretary; and James Millekan, Pomona Terra Cotta Company, Greensboro, North Carolina, treasurer.

Eugene C. Clemens, vice president of the Cannelton Sewer Pipe Company and a member of both the Indiana SPE and the Texas SPE, was among the newly-elected trustees of the organization. Other trustees are: Clark Sutherland of Robinson Clay Products Company; Joseph A. Bryant, Lehigh Sewer Pipe and Tile Company; and D. M. Strickland, National Clay Pipe Manufacturers, Inc.

❁

AAAS Plans Teacher Awards

The American Association for the Advancement of Science has announced that it plans to institute an annual program of awards to outstanding science and mathematics teachers in secondary schools. The program is being established as a means of raising the prestige of such teachers and encouraging public recognition of the valuable contribution they make to the Nation.

The award plan is one feature of a project being developed by the AAAS, as announced in its new pamphlet, *Science Teaching Improvement Program.*

❁

Claxton Heads Building Research Institute

It has been announced in Washington, D. C., that Edmund Claxton, director of research for the Armstrong Cork Company, Lancaster, Pennsylvania, is the new president of the Building Research Institute. The new vice president is William Muirhead, president of William Muirhead Construction Company, Durham, North Carolina, while William H. Scheick continues as executive director.

❁

Technical Institute Foundation Is Established

Representatives of five United States technical institutes met recently in University Park, Pennsylvania, to approve the final draft of articles of incorporation for the Technical Institute Foundation, Inc.

The purpose of the new non-profit organization, which has been established after two years of intensive planning, is to develop technical institute type education in the United States through the mutual efforts of the member in-

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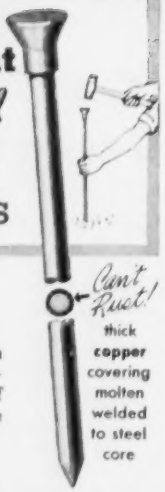

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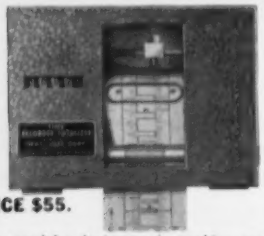

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stitutes. The Foundation will disseminate information on technical institute education, develop curricula and schools, and raise funds to promote technical institute education.

Incorporators and charter member institutions are: H. Russell Beatty, president, Wentworth Institute, Boston; Kenneth R. Miller, president, Ohio Mechanics Institute, Cincinnati; Admiral Logan Ramsey, executive vice president, Spring Garden Institute, Philadelphia; Eugene Wood Smith, president, Cogswell Polytechnical College, San Francisco; and Karl O. Werwath, president, Milwaukee School of Engineering, Milwaukee. Mr. Werwath, a member of the National Society of Professional Engineers, has been nominated as president-elect of the Foundation.

❁

MAPI Executive Committee Includes P.E.'s

Two prominent NSPE members are among the newly-elected members of the Executive Committee of the Machinery and Allied Products Institute. They are E. C. Bullard, president of The Bullard Company, Bridgeport, Connecticut, and James P. Steward, president, DeLaval Steam Turbine Company, Trenton, New Jersey.

Charles W. Stewart, Jr. of Washington, D. C., is the new president of the Institute which is a national research organization in the economics of capital goods and represents a membership of capital goods manufacturers. Vice presidents elected for the 1955-56 term are: Robert W. Gillispie, chairman of the board, The Jeffrey Manufacturing Company, Columbus, O.; Alfred Iddles, president, The Babcock & Wilcox Company, New York, N. Y.; Morehead Patterson, chairman, American Machine & Foundry Company, New York, N. Y.; Guy a Wainwright, president, Diamond Chain Company, Inc., Indianapolis, Ind.; and Thomas H. West, president, Draper Corp., Hopedale, Mass.

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Lubrication Engineers Elect

J. W. Hopkinson, president of the Penn-Petroleum Corporation, Detroit, was elected president of the American Society of Lubrication Engineers during the organization's 1955 Annual Meeting. W. Deutsch of the Trabon Corporation, Cleveland, was named vice president at large, E. R. Booser, General Electric Company, West Lynn, Mass., is the new secretary, and W. H. Fowler, Jr., Pure Oil Co., Chicago, is treasurer.

Regional vice presidents elected were: G. R. Armstrong, B. Greening Wire Co., Ltd., Hamilton, Ont.—Canada; E. D. Harkins, Sr., Farval Corporation, Indianapolis—Midwest; J. O. McLean, Reynolds Metals Co., Richmond, Virginia—East; and M. H. Sperling, Richfield Oil Corporation, Los Angeles—West.

❁

Alumni Sponsor Scholarships At Missouri School of Mines

Announcement of the establishment of nine freshman scholarships for the Missouri School of Mines and Metallurgy, Rolla, Missouri, has been made jointly by Dean Curtis L. Wilson of that institution and H. S. Pence, president of the Alumni Association which is sponsoring the grants.

The scholarships will carry a cash award of $500 for the freshman year and will be based on high school scholastic standing and leadership participation and the comparative results of engineering aptitude tests. With the exception of one scholarship there are no geographic restrictions.

Applications must be on file prior to February 1 for entrance for the succeeding fall semester.

❁

NAM Program Series

The National Association of Manufacturers is now conducting a series of public service radio programs discussing twelve of the United States' important industries and professions including engineering. The series entitled "It's YOUR Business!" is being broadcast over the ABC radio network.

American Engineer

The Magazine of the Registered Professional Engineer

VOLUME TWENTY-FIVE NUMBER NINE

—Photo by Am. Iron & Steel Institute

Is city planning a necessity? The photos at the right depict the shanties-to-skyscrapers progress of Manhattan Island in just 87 years.

We Must Plan Our Cities

By MAJ. GEN. U. S. GRANT, III

President, American Planning and Civic Association

NEARLY two-thirds of the American people live in towns or cities. This urban population is increasing very rapidly, more rapidly than the cities can absorb and digest it. The population of nineteen cities increased 100 per cent or more in the decade 1940-1950; in three of them it tripled. The urgent need for proper development of these urban areas to meet the needs of this increase of inhabitants must be evident to all who give it thought; and the national importance of making appropriate and practical provision for them, if our standard of living is to be maintained, is equally obvious. The major burden of technical advice and practical design and construction to meet this emergency must be borne by the *engineers* of America.

Other professions and vocations—architects, landscape architects, land developers, contractors, realtors, mass transportation executives, etc.—play their part in the building of cities; that is, in the design and construction of the physical elements of our cities which go so far in determining the physical facilities, utilities and amenities which provide for, and at the same time limit, "the pursuit of happiness" and the health and culture of our urban population. But the major burden is carried by engineers, who are usually closely associated with the others in their plans and work. So broad is the field and so varied the technological experience and knowledge now required that much specialization among engineers has become prevalent. Thus we have highway, sanitary, water supply, bridge, tunnel and mass transportation engineers, and many others. The danger of this specialization lies in the tendency of any specialist to lose sight of the general good and the over-all picture, to fight for the cheapest and easiest way to solve his particular problem without due regard to its effect on the city as a whole.

It is, therefore, incumbent upon the engineer, patriotic and good citizen that he usually is, to inform himself about the principles and experiences of city planning, at least in a general way, and to keep them in mind so that his solution of his special problem shall not be inconsistent with the other needs and interests of his city as a whole

Royal Ordinance

for New Towns, etc.

San Lorenzo, July 3, 1573. I the King. Ordinances for discoveries, new settlements, and pacifications. . . . On arriving at the place where the town is to be laid out, the plan of the place shall be determined, and its plazas, streets, and building lots laid out exactly, beginning with the main plaza. From thence the streets, gates, and principal roads, shall be laid out, always leaving a certain proportion of open space, so that although the town should continue to grow, it may always grow in the same manner . . . . If the town lies inland, the main plaza should be in the middle of the town. The plaza shall be of an oblong form, which shall have at the least a length equal to one and a half times the width, inasmuch as this size is the best for fiestas in which horses are used and for any other fiestas that shall be held . . . . From the plaza shall run four main streets, one from the middle of each side of the plaza; and two streets at each corner of the plaza. The four corners of the plaza shall face the four principal winds. The whole plaza round about, and the four streets running from the four sides shall have arcades for these are of considerable convenience to the merchants who generally gather there . . . . For the cathedral, building lots shall be assigned, next after the plaza and streets . . . . After that a site and location shall be assigned for the royal council and cabildo house . . . . Building lots shall not be assigned to individual persons in the plaza where are placed the buildings of the church and royal houses and the public land of the city.

King Philip II
of Spain

Shown is a partial text of the Royal Ordinance for New Towns, etc., as issued by King Philip II of Spain in 1573. Much of the Ordinance was followed when new cities were developed in America. Of interest is the fact that the King's wishes forbade the assigning of individual building lots in the center of the city.

living organism. It is interesting that in the days of Ancient Rome, long before there was any city planning profession, Vitruvius recognized this need for balance between the different approaches to city building and for mutual understandings, when he wrote: "It is not important that preeminence in each [branch] be gained, but he [the planner] must not, however, be ignorant of the general principles of each."

City planning is indeed a recent development in integration or synthesis, made necessary by the very specialization in our city development and the obvious need for reconciliation, among diverse and often conflicting interests, for the good of the city as a whole. Examples of such conflicting interests are of daily occurrence: the too frequent efforts to utilize areas and open spaces, provided with foresight for absolutely required recreation and relief from urban nervous pressures and for better health and normal exercise, for highways or utilitarian buildings; the urge for higher buildings to accommodate a more intense land use, with consequent added traffic problems and burdens on public utilities; requests for rezoning residential land, bought at the lower costs of residential property, to commercial or industrial uses in order to make higher profits obtainable; and many others.

In ancient and medieval times city planning was generally limited to the choice of a salubrious site, adequate transportation facilities (usually by river or sea), and favorable conditions for defense. The over-crowding and insanitary conditions which made plagues so frequent and deadly were usually due to the effort to keep the population within the city walls, against which pressure was gradually built up until it overflowed into suburbs and a new circumferential enceinte had to be built to protect the overflow. The inner streets seem to have followed whatever roads and paths were the nucleus of the original settlement, and the demands of the times. Occasionally a ruler or nobleman of vision and good taste might plan and build a plaza with an architectural composition, the beauty and amenities of which we are still privileged to enjoy and admire. However, it is doubtful whether any thought was given by the builders, or the artists who doubtless advised them, to the city plan as a whole or to the effect upon the rest of the city of their project. St. Mark's Square in Venice, the surroundings of St. Peter's in Rome, the Hotel de Ville plaza in Brussels are well known examples.

It is interesting, however, that Vitruvius did give thought to the over-all plan, and recommended an octagonal shaped city with a central octagonal "Civic Center" and the remaining eight segments separated by major highways leading into the country from the center, with a square of sorts in the middle of each segment. On this he comments: "The plan of a city should not be square, nor formed with acute angles, but polygonal; so that the motions of the enemy may be open to observation. A city whose plan is acute-angled, is with difficulty defended for such a form protects the attacker more than the attacked." We may well surmise that the Romans in their conquests of barbarian lands had cause to give thought to defense in laying out their military colonies. However, I do not remember seeing or hearing of any Roman city that was laid out according to Vitruvius's plan.

A later recognition of the need for an over-all plan on

which to found a city, was Philip II's decree (*see opposite page*) prescribing how the Spanish colonists should lay out their settlements. This decree is interesting in that it prescribes a central square with governmental buildings and a church, indicates a separation of strictly residential land use from commercial and farm use, and sets aside a specific amount of farm land contiguous to the city for crops to support the colonists. Some vestiges of Philip II's plan still remain in St. Augustine, the oldest existing city on our mainland.

SIR Christopher Wren, scientific engineer and practical architect, proposed an improved over-all plan for the rebuilding of the center of London, which had been destroyed by the great fire in 1666. His plan would have been a great improvement and would have added much beauty, as well as bettered traffic facilities, for the square mile inclosed within the old town; but costs and presumably the opposition of property owners prevented its being carried out. It stopped with the building of St. Paul's Cathedral, omitting even much of the setting for it. A similar case of missed opportunity in our day was the failure of San Francisco to carry out Daniel Burnham's plan after the destructive earthquake and fire in 1906.

Generally the Protestant colonies in America were begun amid hardships and dangers which forced them to adopt what Professor Frank A. Waugh of Massachusetts Agricultural College called the "help-yourself method" for the location of houses and the "go-where-you-please method" for the location of their streets and roads. Conquest of the wilderness and food for the next winter were the urgent problems, plans for future urban development could and had to wait. However, there were some outstanding cases of attempts at advance planning. Among these were William Penn's plan for Philadelphia (1682), William Bull's and Robert Castell's plan for Savannah (1733), and the "Grand Model" plan (1694) for Charleston, S. C. But even the best of these were for the small cities expected to grow in the struggling colonies, and where they remain in brick or stone they are proving inadequate for today's population and traffic. It is to be feared that their charm and historic interest will hardly be powerful enough to save them from the onslaughts of the street-wideners and highway builders. Nevertheless, an effort has been made in several of our older cities to save some vestiges of the charm and good taste of olden days by protective zoning. Charleston led the way, to be followed by New Orleans, Alexandria, Va., old Georgetown, D. C., etc. As final decision for destruction of an old house in such zoning ordinances must rest with the elected town authorities and they are sometimes inclined to yield to pressure, it is still problematical as to how much longer such historic remains can be preserved.

Certainly no foresighted thought or sound planning considerations actuated Jefferson's recommendation (1765) of the rectangular system for the survey and subdivision of land in the Northwest Territory, which was adopted by the Congress of the Confederation, or the New York Commissioners in adopting (1811) the rectangular grid system for the streets of their city. In both cases it was just the adoption of the simplest geometric form without the intellectual effort of devising a formula to permit adjustment to topography and the amenities.

THE outstanding city plan of the Eighteenth Century which provided for a sizable city and the growth of a century, and which was the only one approached by its designer as a work of art, was that for the new Federal Capital. This was the work of an engineer, Major Pierre Charles L'Enfant, a French engineer officer who had volunteered for service under Washington during the Revolution and settled in this country afterwards. The son of a well known designer and artist, he seems to have combined good taste, artistic sense and vision with his practical experience and technical knowledge as an engineer. Space is lacking for any detailed consideration of his plan, but the following essential facts must not be passed over: (1) The plan was based on and built up on the terrain, and not on the drafting board. (2) The plan provided for diagonal avenues joining points of topographical prominence and affording the shortest driving distances. (3) The plazas at these points afforded places for local parks and sites for monuments, with mutual vistas—a city of magnificent vistas afterwards, when growth was slow, derisively paraphrased as "a city of magnificent distances." (4) Having located the Capitol on the highest central eminence and the White House on another about three miles away, he proposed a great park system for the central axes of the city with a monument to George Washington at the intersection of the north-south axis with the east-west axis. This central park composition developed and extended on plans carefully worked out in detail by the 1901 Macmillan Commission is unique and a great asset. (5) Largely in response to Jefferson's urging, he finished off the street system with

This very early map shows the plan for St. Augustine, the capital of East Florida, and the oldest existing city on our mainland.

Famous Grandsons Meet . . .

The grandsons of opposing generals at the Battle of Vicksburg meet. They are the author, Maj. Gen. U. S. Grant, III, left, and John C. Pemberton, III, of New York. They were guests at a Civil War Round Table dinner.

—Photo by the Washington Post.

the usual north-south and east-west grid fitted into the topographically located avenues. (6) Of special value in recent years has been the width of streets he provided, 90 to 160 feet, which has permitted growing traffic problems to be met by widening of pavements only, without the expense of widening the right of way, demolishing houses, etc.

L'Enfant's plan did not cover the entire area of the District of Columbia; the part on the Virginia shore of the Potomac River was deeded back to Virginia in 1843, and the sudden accretion of population during and immediately following the Civil War caused suburban settlements to start outside the planned area and with street systems entirely uncoordinated with those in the central city. It was not until 1898 that the street system of the L'Enfant plan was officially extended on a master highway map over the entire District, with such connections in these unrelated subdivisions as practicable. Because these street extensions were put on the highway map without regard to the rougher topography, it has been the job and privilege of the National Capital Planning Commission to lead in changing the map so as to adjust the streets, where not already built, to the topography, thus saving the city millions in construction costs and hundreds of thousands in maintenance.

THE unique features of the L'Enfant plan, the fact that it was the first general plan in this country to be undertaken as a work of art (considering the amenities as well as the practical possibilities of the topography), and that it was the work of an engineer, have seemed to justify this brief description of it. Regrettably, space limitations do not permit even a sketch of the story of city planning development in our country during the late Nineteenth Century and the first half of the Twentieth. It must suffice to point out that architects and landscape architects and a few great foresighted citizens, as well as engineers, have led the movement, so that today the economic and aesthetic values of sound planning are recognized, and most of our cities have planning commissions.

However, mention must be made of some of the circumstances which forced public opinion to this recognition of the benefits of planning, and so gave the new vocation of city planners a status of practical technicians, out of the academic category of mere "starry-eyed planners" as they were once considered.

First, the industrial revolution and urban growth caused congestion and pushed the city limits into the previously accessible countryside, so that by mid-Nineteenth Century the need for parks, more extensive than the little local city parks provided by the Penn plan for Philadelphia, or the early plans for Charleston and Savannah, became appreciated in response to the pleas of William Cullen Bryant, Andrew J. Downing and Frederick Law Olmsted, and resulted in the establishment of Central Park in New York followed by sizable parks in other cities.

Second, the increasing prevalence of factory wastes and sewage in our streams necessitated improved city water supplies, and then subsequent important sewage disposal and purifying systems.

Third, overcrowding of parts of our cities with the vast inflow of immigrants from Europe in mid-century and after the Civil War gave rise to shocking slum conditions that cried aloud for better housing and new schools and playgrounds, resulting in much activity by architects, engineers and citizens with a social conscience to find practicable ways of betterment.

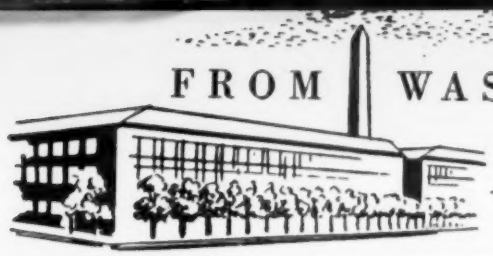
Finally, increased congested business, wholesale and retail, gave rise to traffic congestion, and an awareness of the need for street improvement and planning in our largest cities, even before the advent of the automobile.

As these civic problems converged in their demand for a solution, the World's Fair in Chicago in 1893 burst upon the country: A work of art proving the advantages of combined work by architects, landscape architects, engineers and the embryo city planners. At first its effect was a general quest for "the city beautiful." Indeed, this had been the primary objective of city planning abroad, as in Paris during the First Empire and in Munich. Thus in Europe improved conditions had been obtained by demolition of the old fortifications and their replacement by great boulevards, public buildings and new housing, such as the Ring Strasse in Vienna and the Haussman boulevard system in Paris.

But the experience of city planning in the United States soon showed the practical and economic and social values of sound advance planning, at least to the city planners and to some far-seeing officials and legislators, and also convinced them that any well designed and balanced composition necessarily gave aesthetic satisfaction and a sense of beauty, even without a conscious effort or ornamentation. As Sir Henry Wotton said: "Sound building hath three elements, firmness, convenience and delight." It is the element of delight that our specialized engineers need to have in mind as they solve their individual technical problems, and unless the solutions they adopt are considerate of other interests their structures will never fit into the city as a whole so as to give delight.

THE automobile, enlarging the radius of urban development from 5 to 50 miles in the short period of two decades, the use of new materials and technological meth-

(Continued on page 42)



FROM WASHINGTON

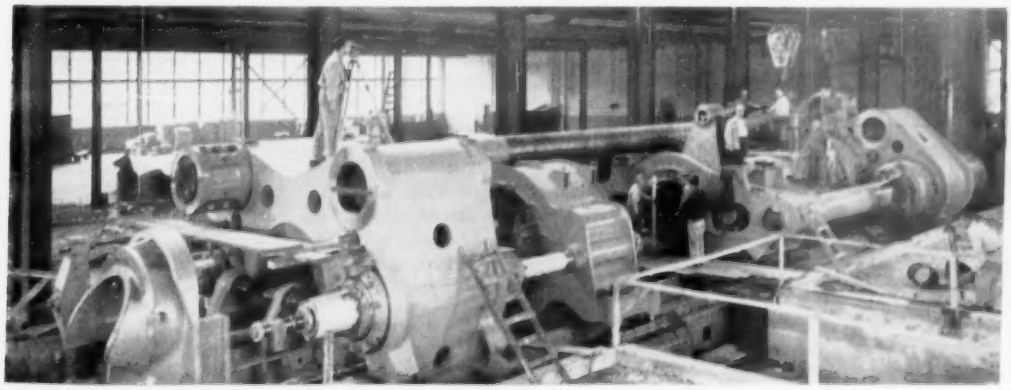
By
Milton F. Lunch,
N.S.P.E.'s Legislative Analyst

ENGINEERS AND THE RESERVE FORCES ACT OF 1955

President Eisenhower has signed the military manpower legislation which has been on its legislative journey since 1952, in one form or another. The new law, known as the "Reserve Forces Act of 1955," was accepted by the President with some misgiving and some specific criticism of what he considers its shortcomings.

A statement by the President accompanying his signature indicates that he will ask Congress to consider amendments to the new law to strengthen what he considers some of its weak points. Among the items in the law which concern the President are those which involve the National Guard, the disparity in pay between National Guardsmen and inductees, and the reduction in the military obligation from eight years to six years.

The law now provides a variety of methods for young men to fulfill their military obligation through a combination of active military duty and service in the Ready and Standby Reserve. The provision of major importance to the engineering and scientific professions is that which authorizes six months of active duty training for volunteers between 17 and 18½ years of age, followed by seven and a half years in the Ready Reserve. In conjunction with this authorization is the further provision which reads as follows:



The new law will mean that engineers and others may discharge their military obligations by a reduced term of active service.

> "In addition, the President, under such rules and regulations as he may prescribe, may authorize the enlistment under this section (6 months' training), without regard to the provisions of (not having been ordered for induction under the Selective Service Act, and not more than age 18½), of persons who fulfill the requirements of (physical and mental qualification) and who have critical skills and are engaged in civiian occupations in any critical defense-supporting industry or in any research activity affecting national defense."

The legislative history of the law makes it clear that the intent of this provision is to provide a method whereby engineers, scientists and other persons in critical callings may discharge their military obligation by a reduced term of active service, followed by a reserve obligation. The reserve obligation in such cases, however, is to be in the Standby (non-active) category under the language requiring the reserve active duty training: "Persons specially enlisted because of their possession of critical skills may be relieved of any obligation to perform the training duty prescribed . . ." Persons in the Standby Reserve will be subject to call to active duty only after a determination of availability by the Selective Service System and only if Congress declares a national emergency.

Engineers and scientists who follow the 6-months' training and Standby Reserve route in fulfilling their military obligation should be aware, however, that Standby status is to exist only so long as the person remains in a position regarded as a critical skill in a critical defense-supporting activity.

(Please turn the page)

(Continued from previous page)

The sum and substance of these related provisions is that any engineer or scientist in the age group vulnerable to compulsory military service may discharge his obligation by volunteering for six months of active duty training, regardless of his age, and serve the remainder of his total obligation in the Standby Reserve, provided that he engages in and remains in a critical defense-supporting activity. This special treatment for engineers and scientists is supplemental to the deferments provided for educational purposes, including graduate study, which are continued under the new law.

Carter L. Burgess, Assistant Secretary of Defense (Manpower and Personnel), who piloted the complicated and controversial reserve program through Congress in what Washington officialdom considers a brilliant performance, told the Senate Armed Services Committee: "We think we have provided quite amply for the scientific and engineering group in this bill. We have considered them every step of the way."

It is unquestionably true that the Pentagon and leaders in Congress did give very deep and serious consideration to the problem of maintaining an adequate force of engineers and scientists in the defense-supporting economy. Whether that concern has resulted in a system which will produce the desired results remains to be seen; for it must be noted that the engineering-scientific provisions are permissive rather than mandatory and call for the exercise of administrative judgement.

Some of the questions to be considered in implementing the special provisions are: the criteria to be established in defining critical skills and critical defense supporting industry or research, the size of the quotas to be established by Presidential Executive Order for critical personnel to enter the six months' program, the limitations which may be placed on the kind and type of technical personnel who qualify, and the procedure and standards to be followed by the Selective Service System in having their local boards advise whether an engineer or scientist should be called to active duty from the Standby Reserve in relation to the criticality of his work.

This much is clear—the new law represents a high water mark in military legislation with respect to understanding and recognizing the unique importance of engineers and scientists to the overall national defense. The legislative journey of the new law also marked a high in cooperation between the Pentagon and Congressional officials and the engineering and scientific organizations of the nation. Assistant Secretary Burgess rendered outstanding service in establishing a climate of sympathetic cooperation and he has publicly acknowledged the valuable aid of the engineering and scientific organizations. If the new law shows unanticipated weaknesses or defects in this important respect he may be expected to openly acknowledge them and cooperatively seek necessary improvements.

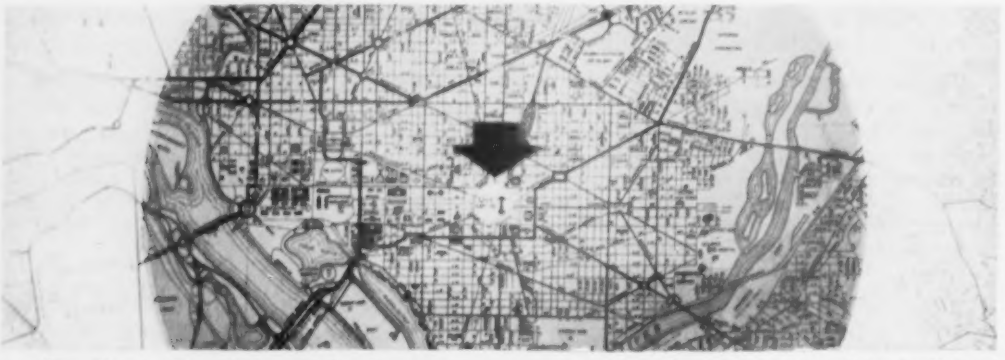
REDUCE GOVERNMENT MAPPING ACTIVITIES

". . . to the extent that the work of private aerial mapping companies meets reasonable Government standards the Government should make use of their services."

That is Recommendation No. 10 of the Hoover Commission's Task Force on Business Enterprises Outside of the Department of Defense. The staff study comment is particularly interesting now in view of President Eisenhower's recent proposal at Geneva that Russia and the United States agree to permit aerial mapping of the defense installations of each nation.

The Hoover Commission body points out that only a small portion of government mapping has been done through contract with private enterprises. It is stated that topographical mapping by aerial photography is much more economical than extensive ground surveys. The report comments that where the work has been done by contract with private organizations the cost has been considerably less than when the government has done the work.

The staff study notes that in some cases, such as the hydrographic mapping by the Coast and Geodetic Survey, or basic triangulation used by other mapping services, aerial surveys are not feasible, but emphasis is put on private aerial mapping where possible.



The Hoover Commission thinks that more government maps such as this one issued by the Federal Civil Defense Agency could be done by private firms.

The Role of the Technician in Our Nation's Future

by KARL O. WERWATH, P.E.,
President, Milwaukee School of Engineering

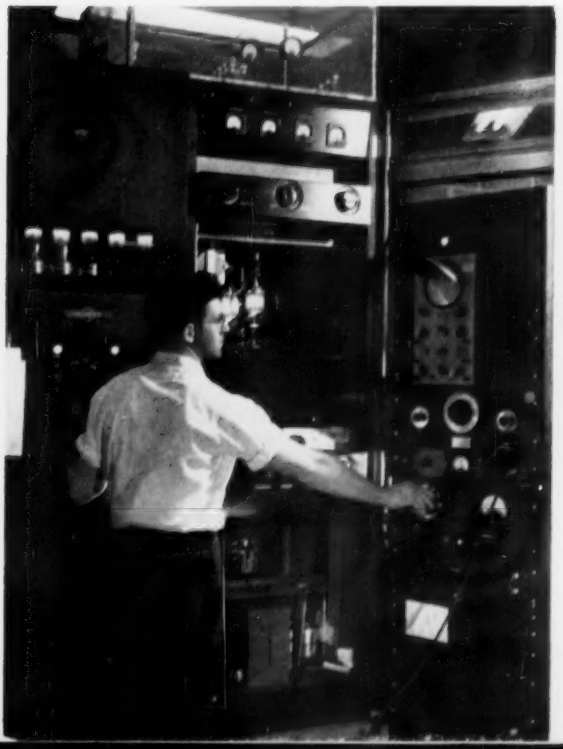
ONE of the areas of higher education receiving greater attention now, with the contemplated expansion to meet the tidal wave of students, is the technical institute. It is anticipated that, to meet the demand for engineering technicians during the next decade, increase in full-time enrollments for technician programs will be fourfold.

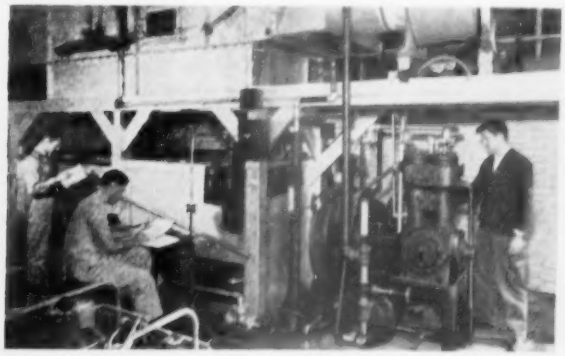
Our rapidly expanding technology, especially in new industries for both commercial and industrial progress and in the interest of national defense, forces us as a nation to upgrade and increase the supply of our technical personnel. Consider the new requirements of aeronautics and similar industries, such as automotive, electronics, air conditioning, plastics and nucleonics. Then we quickly understand why there are myriad previously non-existent technical career opportunities. Additional technical jobs are being created through the automation of production and the increased utilization of electrical and mechanical power to do our heavy, repetitive and tedious work.

The growing need for technical manpower is in two directions: Number and depth of technical know-how. We are acutely aware of the demand for professional engineering personnel. Actually, much of the problem is the alarmingly small number of sufficiently qualified engineering technicians.

Our best analyses point up the need for 30,000 to 35,000 four-year engineering graduates each year. This is about 200 per million population and parallels closely existing ratios in other modern industrial nations of the world today. But these engineers are a part of an engineering team which includes *five* engineering technicians per graduate engineer. This is in addition to numbers of skilled craftsmen. These engineering technicians are engaged in vital, fundamental functions in product development, production, distribution, application, operation and maintenance, yet we are graduating only one-eighth the needed number now. *To retain our position in this twentieth century economy, we must increase ten times the number of qualified engineering technicians, some 160,000.*

WHO is this engineering technician? What does he do? And what is his preparation for his work? A formal definition, as developed in 1953 by the Recognition Committee of the Engineers' Council for Professional Development, is as follows:





Above: The air conditioning, heating and refrigeration fields offer the technician opportunities in manufacturing, contracting and servicing. At left: The expansion of electrical communications through electronics is one of the most important phases of our modern national economy, security and entertainment.

"An engineering technician is one who can carry out in a responsible manner either proven techniques which are common knowledge among those who are technically expert in his branch of engineering, or those specially prescribed by professional engineers. Under general professional engineering direction, or following established engineering techniques, he shall be capable of carrying out duties which may comprise. Working on design and development of engineering plant; draughtsmanship; the erecting and commissioning of engineering equipment or structures; estimating, inspecting and testing engineering equipment; use of surveying instruments; maintaining engineering machinery or engineering services and locating faults; operating, maintaining and repairing engineering plant; or activities connected with research and development, sales engineering and representation, servicing, and testing of materials and components, advising consumers; and training and education.

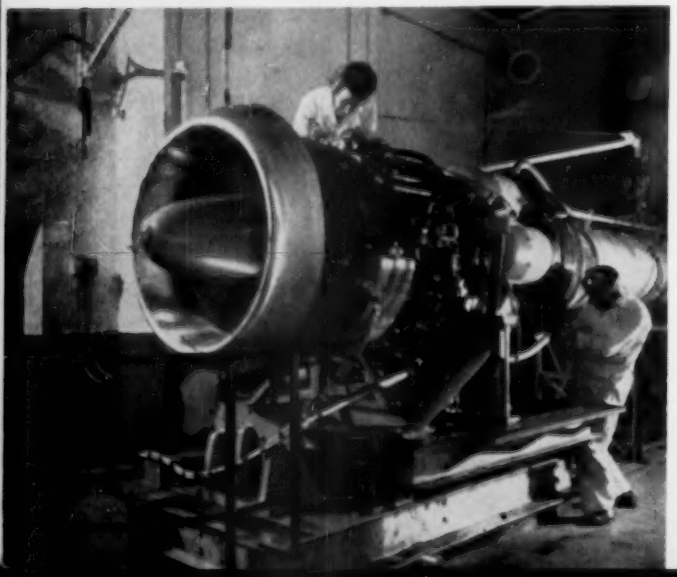
"In carrying out many of these duties, the competent supervision of the work of skilled craftsmen will be necessary. The techniques employed demand acquired experience and knowledge of a particular branch of engineering, combined with the ability to work out the details of a job in the light of well-established practice.

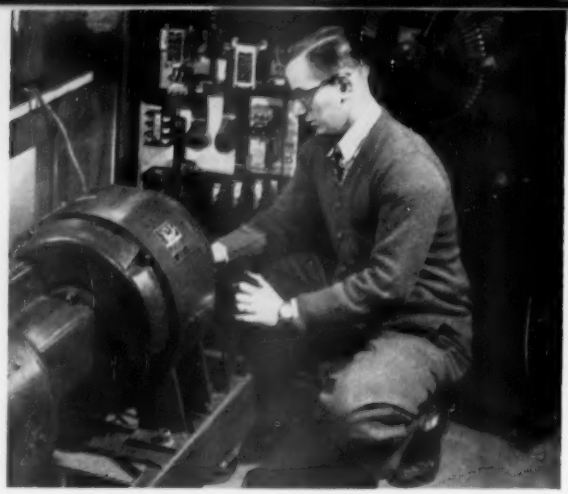
"An engineering technician, therefore, requires a background sufficient to enable him to understand the reasons and purposes of the operations for which he is responsible."

While the engineer plans, the technician makes and does; while the engineer creates, the technician applies. This engineering technician is often the liaison between the professional man and the craftsman.

The "engineering team" is engaged in taking the load from human and animal muscles and using our natural forms of energy and machines, so that this work is now done 95 per cent by machines, whereas in the Civil War days, probably 15 per cent of the work was accomplished that way. New machinery is taking people out of the labor force and substituting mechanized power and control. This requires a new high degree of technical skill by our workers if we are to maintain our productive leadership. Such become a part of the "engineering team." To maintain our productive leadership of 5 per cent of the people producing 50 per cent of the world's goods, which we must do to maintain our economic and political leadership, requires that each individual understand clearly his part in this production and distribution effort; and

The ratio of technically trained to untrained personnel increases at a high rate in air transportation manufacturing, research and development.





Installed capacity for producing and equipment for using electrical power doubles every ten years; the forecast is a trillion kilowatt hours a year by 1970.

especially if he is engaged in technical work, that he understand the broad implication and specialized know-how of not only his technical job, but the economic and human factors as well. In recent years, we have been making an analysis of engineering technician jobs held by our alumni, classifying skills through a job specification and aptitude testing plan. The project is one of the Professional Development Committee of the Engineers' Society of Milwaukee and calls for a classification of skills in three broad categories:

1. **Preponderantly technical abilities**
2. **Preponderantly psychological traits**
3. **The physical and manual characteristics**

We have found, in analyzing jobs, these three classifications useful to help set up broad percentages in these various skills comprising the total skills required of a particular job. Statistics are now available for first jobs of 125 for the engineering technician and 114 for the engineering classifications. They have been obtained by writing employers one year after a graduate has been employed, asking for the breakdown of these jobs.

A DETAILED summary of the minimum requirements of four characteristic engineering technician occupations in the refrigeration, heating and air conditioning fields is reproduced on the opposite page. The grading is of the traits for these four specific occupations:

1. **Factory Representative**
2. **Service Technician**
3. **Sales Representative**
4. **Laboratory Technician**

By combining the selected level of each of the 16 traits, a rather specific definition can be compiled for a specific engineering technician job. Such an evaluation aids the employer, employee technician and the educator who builds the curricula which are designed to prepare men for such jobs.

For the first jobs engaged in by technicians, we find that 55 per cent of the total skills, on an average, are labeled as technological in character, 19 per cent as psychological and 26 per cent manual. Therefore, in a general way, one-half of the skills of a technician on his first job are considered by the employers to be technological, one-fourth psychological and one-fourth manual.

(*Continued on page 45*)

Characteristic Minimum Requirements of Four Engineering Technician Occupations in the Refrigeration, Heating and Air Conditioning Fields

●

	Factory Representative	Service Technician	Sales Representative	Laboratory Technician
Preponderantly Technical Traits				
1. *Scientific and Engineering Knowledge*—The job requires:	1	2	3	4
A—Carrying through a long series of varied complex analyses involving a number of technical fields. Indicate fields:				
B—Carrying through complex analyses in one specific field.			B	
C—Carrying through simple analyses in one specific field, independently.	C	C		C
D—Carrying through simple analyses in one specific field with some technical assistance and guidance.				
E—Interpreting only simple technical facts under close supervision.		E		
2. *Mathematics*—The job requires:				
A—Developing complex mathematical formulae from observed and deduced data.				
B—Applying calculus and higher mathematics to assigned problems.				
C—Applying college algebra, analytical geometry, trigonometry and logarithms.	C		C	
D—Applying high school algebra, geometry, trigonometry and logarithms.				D
E—Using arithmetic, percentages, fractions, etc.				
3. *Plans, Drawings, Diagrams and Codes*—The job requires:				
A—Preparing complicated plans, diagrams or codes.				
B—Preparing a variety of simple plans, diagrams or codes.	B		B	
C—Interpreting simple plans, diagrams or codes for others for action.		C		
D—Understanding simple plans, diagrams or codes.				D
E—Little or no knowledge of engineering plans, diagrams or codes.				
4. *Research*—The job requires:				
A—Developing numerous ideas, techniques and new sources of information for the original solutions of new applications in various fields.				
B—Establishing experimental procedures in developing new relations and applications in a specific field.				
C—Associating new ideas and developments with new technical problems.	C	C		C
D—Using only past experience in meeting new technical problems.			D	
E—Little or no research ability.				
5. *Organization of Technical Work*—The job requires planning and organizing of:				
A—Complex work assignments for numerous interrelated groups.				
B—Work for numerous unrelated individuals.	B			
C—Work for a small single group of individuals.			C	
D—Varied technical work for own execution.		D		D
E—None required; routine work only.				
6. *Clarity of Expression in Speech*—The job requires:				
A—Preparing and presenting highly technical subjects clearly and conclusively for critical audience.				
B—Presenting complex ideas clearly and conclusively in reports or conference.	B		B	
C—Speaking extemporaneously and convincingly about simple ideas and things in everyday contacts with customers, associates, etc.		C		
D—Conveying instructions clearly to others.			D	
E—Meeting only normal conversational requirements.				
7. *Clarity of Expression in Writing*—The job requires the writing of:				
A—Highly technical material for interesting reading.				
B—Comprehensive reports with sound conclusions for basis of action.			B	
C—Technical correspondence with sales representatives, customers, etc.	C			
D—Informal memoranda and routine reports.		D		D
E—Job does not require writing abilities.				
Preponderantly Psychological Traits				
8. *Self-reliance and Drive*—The job requires:				
A—Initiating and following through simultaneously multiple complex problems with dispatch.				
B—Initiating and carrying through unrelated complex projects.	B		B	

	1	2	3	4
C—Following through single complex projects.		C		C
D—Following through simple projects unaided.				
E—Following through simple projects with assistance.				
9. *Social Intelligence and Tact*—The job requires:				
A—Recognizing and reconciling divergent viewpoints in a group working under difficult circumstances.				
B—Ability to maintain good personality relationship in everyday job relations.	B	B	B	
C—Recognizing social relationships and problems between oneself and other individuals.				C
D—Recognizing social relationships and reconciling social situations between two other individuals.				
E—Little personal contact—almost no skill required.				
10. *Emotional Stability*—The job requires:				
A—Great stability—in addition it requires the ability to maintain and encourage stability in others.				
B—Great stability in coping with emotional stress involved in unusual pressure of work.	B		B	
C—Stability when under more than usual pressure to expedite work.		C		C
D—Stability when under occasional heavy demands in work load.				
E—Stability in routine work with little or no personal stress involved.				
11. *Dependability in Scientific and Engineering Work*—The job requires thoroughness and accuracy on:				
A—All work submitted or supervised including that of complex relations in new technical areas.				
B—Complex analyses and calculations in relatively familiar field.	B		B	
C—Simple analyses and results.		C		C
D—Simple formulae and results.				
E—No responsibility for accuracy.				
12. *Leadership in Work Direction*—The job requires giving:				
A—Inspiring leadership of groups on a variety of activities which is effective through two subordinate levels of supervision.				
B—Inspiring leadership and coordination of simple activities which is effective through one subordinate level of supervision.	B			
C—Direct leadership for small groups.			C	
D—Leadership on occasions only when requested.		D		D
E—No leadership.				
13. *Sales Ability and Interest*—The job requires ability to interest and convince:				
A—Numerous people with varied ideas about new ideas and things.				
B—Small groups of people with varied interests about new ideas and things.	B		B	
C—Individuals about ideas.				C
D—Individuals in things.		D		
E—Does not require ability to influence people.				
14. *Professional Aims and Development*—The job requires consistent interest in and:				
A—Contributing time and effort to community and civic interests.				
B—Contributing time and effort to advancing the sciences or the engineering profession.				
C—Improving self culturally, in some subject, through a definite program.	C		C	
D—Developing self technically for present or next job.		D		D
E—Devoting little or no effort to technical self-improvement.				
Physical and Manual Characteristics of an Employee				
15. *Appearance and Bearing*—The job requires:				
A—Appearing confident and poised in difficult situations.			A	
B—Ready acceptance by strangers for appearance and bearing.	B	B		
C—Acceptance by associates in respect to appearance and bearing.				C
D—Appearance is not a factor.				
E—Appearance not applicable.				
16. *Manual Abilities and Skills*—The job requires:				
A—Great manual skill with fine tools and equipment in conjunction with a good sense of proportion and creative imagination.				
B—Good manual skill with fine tools and equipment with good sense of proportion.		B		
C—Good manual skill with a variety of simple tools and equipment.	C			C
D—Fair skill with simple tools and equipment.			D	
E—Little manual dexterity. (Indicate tools and type of equipment used.)				

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Engineers' Society of Milwaukee

U. S. Publishers Overwhelmingly Back Neff's Plea for Math Study

A HIGHLY successful appeal to the nation's publishers to help stimulate interest in high school mathematics and science courses has been made by NSPE's new president, Allison C. Neff.

In a letter sent out through the NSPE headquarters office to approximately 800 publishers of daily newspapers, Mr. Neff asked the help of the press as a first step to "stem the tide of students away from elementary mathematics, physics, and chemistry."

The personally addressed letters asked that the publishers consider these facts:

1. **Only about 25 per cent of our high school students now study algebra.**
2. **Only about 12 per cent of our high school students now study geometry.**
3. **There are many small and even some large high schools which offer no courses in the physical sciences.**

"With America entering the first phase of the so-called atomic age we find ourselves in the amazing position of having a declining percentage of high school students enrolled in such basic courses as elementary algebra, and plane and solid geometry," the letter stated.

The publishers were further told that "without a high school background in elementary mathematics, a young person entering college is severely handicapped, and often all but blocked, in the pursuit of a career in engineering."

Mr. Neff suggested that the daily newspapers ask these questions: "Are there high schools in this community where students cannot get the background necessary for college work in engineering? Do high school counselors in this community attempt to stimulate an interest in training for a career in engineering? Is the number of high school students enrolled in algebra and geometry decreasing in this community?"

Pointing out that many recent studies by educational and governmental agencies indicate that the decline in high school enrollment in elementary math courses is increasing, Mr. Neff added that "the future course of American industrial achievement and national defense will be largely dependent on the engineering skills which can be developed from the generation now in high school."

Included in the mailing to the publishers was a reproduction of an editorial in the *New York Times* expressing serious concern over the general decline in the percentage of high school students enrolled in basic math courses.

A steady stream of letters and newspaper clippings from publishers whose papers have a combined circulation of nearly ten million, has been received by the headquarters office since the mailing several weeks ago. The letters are congratulatory in tone and indicate that the daily newspaper publishers are aware of the lack of in-

BATTLE CREEK ENQUIRER AND NEW

'chools Here Show Interest in Science

In a letter appearing on Friday's editorial page, Allison C. Neff, ident of the National Society of Professional Engineers, warned of easing interest in scientific courses in high schools, and of the to American society which this tendency, if continued, will bring. The remarks do not apply to Battle Creek Central and Lakeview Schools in the opinion of their officials. They report scientific rest on the increase as measured by the addition of classes in tougher, academic subjects. the same time, one of the on interviewed said that if ness and industry don't stop ling" the teacher colleges for neers, there will be an increas- shortage of mathematics and ce teachers to train the on- ing generation of engineers. incipal John W. Postma of tral High School, a former hematics teacher who has sed for more attention to that l, including "some mathematics every student," was inter- ed, as were Supt. Flo

ineering Leader Calls for re Interest in Science Courses

ppeal to the Nation's pub- to help stimulate interest h school mathematics and e courses has been made e president of the National y of Professional Engineers, a letter to approximately 800 shers of daily newspapers pn , n 36, p. a firs lents hema y." Mr. L

The Philadelphia Inquirer

Neglecting High School Science

An appeal made by the National Society of Engineers for a campaign to get educators to reverse a trend in the high schools away from subjects basic to science—such as elementary algebra, plane and solid geometry, physics and chemistry—is a much needed leadership.

o the future of this ich this newspaper —that at the very e of engineers and nd progress of the lainly evident, our less and less effort s that lead result has umber of ing these earth of

young person entering college is severely handicapped, and often all but blocked, in the pursuit of a career in engineering."

Mr. Neff suggested that the daily newspapers ask these ques- tions: "Are

Staunton, Va., News-Leader, Fri., Aug. 12, 1955

Low Interest In Basic Science Alarms

President Allison C. Neff, P. E., of the National Society of Professional Engineers, has asked The News-Leader to call attention to "which, if not corrected, will have grave impact on the nation." Mr. Neff has reference to "the basic mathematics and

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PUBLIC OPINION Battle Creek Enqui Jul

Need for Mathematician alled Challenge to Sch

Editor, Enquirer and News:

As president of the National ociety of Professional Engineers am taking this opportunity on half of our membership to call ur personal attention to a "c- ition which, if n ill have grave im ture security of ou I am referring to easing interest in sic mathematics an r high schools. W ttering the first pl -called "atomic age rselves in the amazi having a declining high school studen such basic courses a ry algebra, plane ometry, physics and e seriousness of the

person entering college handicapped, and ofte blocked, in the pursuit in engineering.

In vie imp e pl ued

The New York Times

AN ALARMING SITUATION

A sense of shock must be felt by any thinking citizen who studies the state of science teaching in our high schools as described in these col umns yesterday. Only about half our high schools offer courses chemistry or physics, and less th 5 per cent of our high school s study physics. Less thar students at

terest in math studies in the schools.

Among the large metropolitan papers devoting a lengthy editorial to the letter was the *New York Daily News*. Mentioning NSPE by name, the editorial advised that "If you're young, ambitious, and of a scientific or mechanical disposition, better hammer away on math throughout your high school and some of your college years. You can be close to 99 per cent sure that you'll never regret it."

The *St. Louis Post-Dispatch* published the letter in its letters-to-the-editor section, as did the *Herald Press*, of St. Joseph, Michigan, and several other papers.

An editorial in the *Philadelphia Inquirer* termed the question raised in the NSPE letter "a much needed effort at public-spirited leadership."

The paper's editorial writer declared: "It is a grave danger to the future of this nation—and one of which this newspaper has warned many times—that at the very time when the importance of engineers and scientists to the safety and progress of the United States is most plainly evident, our public schools are making less and less effort to interest young people in subjects that lead to careers in technical fields. The result has been a progressive decline in the number of college freshmen interested in following these studies at the college level . . ."

An editorial in the Tulsa, Oklahoma, *Tribune* was based on the NSPE letter, and commented: "The task facing both education and the sciences is much broader than merely achieving increased enrollments in mathematics, physics and chemistry. A reversal of the trend must come as a part of our real understanding of future responsibilities, as a response to the compelling forces of world events."

Down in Texas the *Houston Chronicle* also based an editorial on the NSPE letter and stated that "it is time our school administrators awakened to their failure."

The *Chronicle* further commented that "we are living in an age of tremendous technological advance, an age in which the engineer is a key man, not only in our national safety but in the production of abundance for our way of life. The future of American industrial achievement lies with these men."

In the same city the *Houston Post* devoted a lead editorial to Mr. Neff's letter and referred to its subject matter as of "great importance to the youth of the nation, and to the nation itself."

"The America we enjoy today," the *Post* stated, "is the product of its engineering skill. What has come over our young people that they have become so soft they cannot be bothered with high school courses they consider tough? Or, more important, what has come over parents that they do not insist that such courses be studied? The youngsters may not be aware of the situation, but parents who wish for them a good and useful life should take notice of it. If they do not get mathematics and science in high school, it usually is too late."

In the New England area the Bedford, Mass., *Standard-Times* published an editorial in one of its Sunday editions mentioning Mr. Neff and the NSPE. The editorial urged that "school administrators, teachers and vocational counselors can perform a valuable service to their students and to the nation by impressing upon youth the country's need for scientifically trained men and women, and the importance of students taking appropriate courses in high school."

In Huntington, W. Va., the *Herald-Advertiser* turned out a lengthy feature article on the general subject of Mr. Neff's letter. The author referred to the local situation and declared: "Here in Cabell County it is possible for a student to go through three years of high school with biology the only science and no mathematics at all. Result is that many a high school graduate has had no contact with mathematics since he was in junior high school. He took a beginner's course in algebra in the ninth grade. He's never had an in-

(*Continued on page 47*)

Engineers' Chief Stresses
Of High School Math and S

The Post has received a letter from Allison C. Neff, president of the National Society of Professional Engineers, concerning a subject of which much has been said in these colum

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hematics in High School

The Tulsa Tribune

It becomes alarming when we near t
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education in the sciences is booming in eve
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Says Allison C. Neff, of Washington, pres
lave fe It is a ident of the National Society of Professiona
State Engineers, "This situation, if not corrected
for ye will have grave impact on the future se-
curity of our nation." Well it might.

Experts in such things hazard guesses as

DAILY NEWS
NEW YORK'S PICTURE NEWSPAPER

Some statistics offered by the NSPE: Only about 25
U. S. high school students nowadays study algebra . . . interest in
physics and chemistry—two sciences in which knowledge
of mathematics is essential—has fallen off so markedly
that some high schools have quit teaching these subjects.

Some of those reasons are valid. But
sons for an unsatisfactory condition should
never be accepted as excuses for that condi-
tion to continue.

The task facing both education and the
sciences is much broader than
achieving increased enrolments
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National Society of Profes-
Engineers is alarmed at the
interest young people are
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American educators have put the emphasis on the need for study of the humanities. They have dispâraged business courses, vocational trainmg and some of the mechanical sciences. The result has been a turning to letters, the ancient classics, and subjects
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Sunday Standard-Times
NEW BEDFORD, MASS.

ATOMIC AGE EDUCATION

A paradox in this country today is an increasing need for scientists of all types and a decreasing interest in scientific subjects by high school students.

Allison C. Neff, president of the National Society of Professional Engineers, has pointed out that only about
percent of high school students study
geometry.

N.S.P.E. Believes

OUR IMPACT ON THE PUBLIC

BY PAUL H. ROBBINS, P.E.

Executive Director

N.S.P.E.

ONE of the difficulties frequently pointed out in discussions on the need for public relations by the engineering profession is the fact that the average engineer has little direct contact with the public. True, the consulting engineer has his client and has a direct relationship with the public-at-large which tends to bring this segment of the profession to the public's attention. But the number of engineers who emerge as consultants represents a minor part of the profession. Statistics have shown that the vast majority of engineers are most readily identified as associated with industrial enterprise.

Engineering is unique in this respect, for no other professional group is so well hidden behind the results of its endeavors. Certainly law and medicine, with their opportunities for service directly in contact with individuals, are much more evident on the public scene. The same may be said for the clergy and the teaching profession. While this perhaps makes the job more difficult, NSPE nevertheless believes that an important responsibility accrues to the professional society and to the individual members of the profession to be constantly alert to ways and means by which the results of their training, experience and knowledge have bearing on the everyday lives of individuals.

Major General Ulysses S. Grant, III, in his thought-provoking article in this issue of the AMERICAN ENGINEER, points up some of the many problems paramount in the life of each of us which must be solved by engineers. As populations have become more concentrated, as the trend toward urban living has created housing problems, transportation problems, traffic congestion, and new challenges in the fields of merchandising, distribution and supply, the engineer is called upon more and more to apply his knowledge to find solutions. Literally thousands of engineers are inconspicuously focusing their specialized knowledge in these areas.

NSPE believes that members of the profession should be encouraged in every opportunity to present to the general public a better understanding of the contributions of the engineering profession. There are a number of opportunities open to most engineers. For example, many members of the profession are also members of service and social clubs. Program chairmen of these organizations are constantly searching for those qualified to discuss items of broad public interest. Of course, engineers concerned with activities in the public realm—such as traffic, streets, sewage and sanitary problems, highways and the like—can offer obvious subjects for such discussions. However, engineers associated with industrial enterprise many times do not grasp the opportunity to lay before the public some of the engineering problems inherent in the manufacture or development of products in everyday use.

Another opportunity frequently missed by engineers is entering deliberations of public matters in which there are engineering aspects and to which their specialized knowledge may add important and interesting information. For example, in discussion of the universal problem of education, the questions of cost of facilities and predictions for needs have engineering aspects.

One of the most neglected opportunities for discussion of work in which individual engineers are involved is in small groups and with neighbors. Many times, of course, there is a confidential nature to this work which prohibits presentation of details, and many times this inhibits an engineer from even speaking of his employment. Often, too, he is aware of his limitation to put in lay language some of the things with which he is constantly concerned. The individual engineer should not only endeavor to become adept in covering in simple language some of the ways in which his work and that of other engineers affects the daily life of every citizen, but also he should take the lead in overcoming the natural reticence of technically-trained individuals to discuss some of the intricacies of our modern way of life.

NSPE is endeavoring to assist not only its members but also its affiliated units, through distribution from time to time of the Chapter Public Relations Newsletter, the National Engineers' Week Kits, news releases on important engineering items of interest to the public, and ideas which make good radio, television, or public appearance programs.

NSPE further believes, however, that individual engineers would do well to study ways and means of dramatizing the work for which they are responsible. It is time that individual members of the profession make it abundantly clear that many of the necessities and luxuries of 20th Century living are made possible only through the ingenuity and resourcefulness of the members of the engineering profession.—***End.***

For a Profession

Ethics Are the Prime Essential

by CLEMENT J. FREUND,

Dean, College of Engineering, University of Detroit

PROFESSOR John J. Uicker is Chairman of the Department of Mechanical Engineering in the University of Detroit. About a year ago he received a letter. It came from one of his graduates of the class of June, 1953, who is now employed on the Pacific coast. The following is from this letter:

> In the last issue of *Aviation Week* I ran across a report of the strike of the engineers at Sperry Gyroscope Company. Those engineers were represented by a union. What is the profession coming to? Don't the engineers of today realize that unionization of professional men means that they are no longer professional? I know that this question has been asked of you many times in the past, but frankly, I am worried.
>
> Here at (name of his employer) I have had an opportunity to associate with engineers from schools all over the country. Not even 5 per cent of them consider that engineering is a profession. They come to work in old clothes, bring lunch pails and generally act like a bunch of slobs. (I hope that he did not learn his language tricks at the University of Detroit.) The only thing the 95 per cent worry about is money. During their off hours they don't study or try to further themselves culturally or technically.
>
> The fault probably lies with the schools from which they graduated. They were taught to act like tradesmen, not like professional engineers.

You may question the reference to the lunch pail. I carried one myself a number of years. But we all know what the boy means. Here, at least, is one young man who is worried about professional status. I think that too many of us feel that nobody cares whether or not engineers are professional except a dozen or so past presidents of national engineering societies who have nothing else to do.

The letter suggests that young engineers are concerned about professional standing. Indeed, after talking to very many senior students and recent graduates, I believe that the young men may be more concerned about professional standing than the older engineers.

Perhaps I should explain, at this point, that I am not opposed to labor unions when they are properly and legally run. They have been of great help to working men. But engineers are not working men. I am definitely opposed to labor union organization of clergymen, physicians, lawyers, professional engineers and all others who are clearly professional.

People will tell you many reasons why the professional standing of engineers cannot compare with the professional standing of physicians and surgeons. The most important reason, in my opinion, is that we engineering educators simply have not told our students what it means to be professional.

Walk in on any meeting of a typical section or branch of any of our important American engineering societies. If you were to ask those who are present: "What does it mean to be professional?" I am afraid the great majority would say that they do not know, and the remainder would tell you that your question is silly.

Some of us have the notion that to be professional is to be highly educated or trained. I am sure that every man in the room has read passages like the following in discussions or announcements of one kind or another pertaining to engineering education:

> And for those students who aim to become truly professional, graduate courses are available leading to master's and doctor's degrees.
>
> Or: The doctor's degree represents the apex of study for professional engineering.
>
> Or: Our graduate schools, the stronghold of professional engineering.

Really, there is no direct connection between professional standing and advanced study of engineering technology. I can easily picture a doctor of engineering who is the world's authority on heat transfer, but who does not have a trace of professional understanding. On the other hand, I suppose that there are few American engineers who better appreciate the true meaning of professional status than, for instance, Senator Flanders. And the Senator never went to college at all.

Dean Freund speaks before the Ohio SPE of the NSPE.

The work of the engineer demands ethical practices.

Professional standing is not the result of technical education. It is a matter of attitude, approach to one's work. The following is from Wickenden's famous *Second Mile:*

> To possess and to practice a special skill, even of a high order, do not in themselves make an individual a professional man. Mere technical training at any level, (even post-doctoral; my insertion) is vocational rather than professional. The difference between technical training and professional education is no simple matter of length—any difference of two years, or four, or six; nor is it a mere matter of intellectual difficulty. It is rather a matter of spirit and scope.

Spirit and scope, there you have it. Those are the essentials of a profession. Of course, the professional man must be technically competent; he must know his business. But the most difficult technique in the world does not in itself make a man professional.

Now, what do we mean, specifically, when we talk about the spirit and scope of a profession? Let Vannevar Bush answer. This is from his well known address, "Qualities of a Profession," before the American Engineering Council in January, 1939:

> **In every one of the professional groups, however, will be found the initial, central theme intact—they minister to the people. Otherwise they no longer endure as professional groups. Ministry carries with it the ideas of dignity and authority. It connotes no weakness and offers no apology. There is no fog of subservience surrounding the concept. The physician who ministers to his client takes charge by right of superior specialized knowledge of a highly personal aspect of the affairs of the individual. The attorney assumes professional responsibility for guiding the legal acts of his client and speaks with the whole authority of the statutes as a background. It is in this higher sense that we trace the thread of ministry to the people.**
>
> **It does not matter how much was retained of trappings and mysticism, nor what the profundity of utterances, there has been no true profession that has not with dignity and authority advised and counseled the people.**

Bush's concept of the essential character of a profession checks closely with opinions of philosophers, scholars, and the general public. It seems safe to conclude that the *principal requirement for professional standing is to minister to the public.*

Now we proceed to the next step in our development. The professional man who ministers to the people must be morally responsible; he must be trustworthy. That is, he must be ethical.

This is particularly important because the public knows nothing about professional technology. The citizen is completely at the mercy of the professional man.

For example, assume that my arm has been bothering me for some weeks. It does not seem grave and I neglect to get medical help. Then, one morning, it is badly swollen and I have severe pain. I visit a surgeon. After extended consultation, he tells me that the arm must be amputated.

It is very important, of course, to know that he is competent to do his work. But it is much more important that he is not taking off a perfectly good arm, or one that could be treated and cured, just to collect a handsome fee for doing the job. I don't know a thing about surgery or medicine; I have to take the surgeon's word. I want to know, I very badly want to know that he is ethical.

So it is in engineering. People don't know anything about our technology. They have to depend on our integrity every day. They have to take our word for it that we haven't been cheating to gain a dollar here or there when we:

Purify city drinking water.
Insulate electric wires and apparatus.
Specify materials for railway air brakes.
Design linkages for airplane controls.

People have to depend on our integrity when we design and manufacture such things as explosives, automatic guns, corrosive gases and hydrogen bombs. But they can't depend on our integrity unless we are ethical.

Now what are we to do about it all? I am sure there is nothing more urgent than for all of us to learn more about ethics, and to do some honest worrying about ethics. I suggest that you give careful consideration to the following:

First, to write to the headquarters of the National Society of Professional Engineers for a copy of the Canons of Ethics of Engineers' Council for Professional Development, if you have none, and read it; and read it again if you have read it before.

Second, to prevail upon the officers of your local sections of engineering societies to organize meetings for the discussion of ethics.

Third, to prevail upon the national officers of the national engineering societies to which you belong regularly to include sessions on ethics in their national and regional programs.

Fourth, to find what they know and do about ethics before you hire engineers who desire to work for you.

Fifth, to insist that every engineering society of which you are a member specify written endorsement of the Canons of ECPD, or some other appropriate code, as a requirement for membership.

Sixth, to write to the editors of your favorite technical journals and demand that they publish articles and papers on the topic of ethics.

Seventh, to talk about ethics to your engineering friends when you get together with them.

Eighth, especially, to talk about ethics to young engineers and to students whenever you have the opportunity to meet with them.

This is what I think we should do.—***End.***

New Mexico Court Upholds Revocation Provisions

In a significant decision, believed to be the first on the point, the Supreme Court of New Mexico has ruled unanimously that the state engineering registration law provision authorizing revocation of an engineering license is valid even though the grounds for revocation are stated in general terms.

The decision reverses a lower court holding that the revocation section was unconstitutional for lack of definiteness and definition (AE, Aug., 1954). The case arose out of an action of the New Mexico engineering registration board in revoking the licenses of two Albuquerque engineers who had been dismissed as consultants to the city on the grounds of inadequate supervision of a sewer project.

The New Mexico law authorizes revocation of a license for "any gross negligence, incompetency, or misconduct . . ." Because this language is similar to the authority contained in many other state laws, extracts from the Supreme Court's detailed analysis and opinion are quoted below:

* * *

"We may safely asume these words were employed by the legislature in the sense in which they are commonly understood. Then, what is the generally understood meaning of these words and phrases? (The court quoted definitions from Webster's Dictionary and Bouvier's Law Dictionary.)

"In resolving the question before us, we should not overlook the fact that the licensing act assailed is only one of some 30 or more kindred acts regulating the licensing and conduct, as well as the revocation of licenses of the various businesses, occupations and professions in the state. Many of them have set forth as grounds for the revocation of licenses, exactly the same ones or their equivalent of those found in the act regulating professional engineering.

"One has only to run through these various enactments to ascertain the common pattern recognizable in practically every one as the basis for revocation of a license. Some are in greater detail than others in enumerating grounds of revocation, to be sure, as for instance, dealing with dentistry. But we need look only at (the act) setting up grounds for revoking the license of physicians and surgeons, namely, that the registrant has been found guilty of 'immoral, dishonorable or unprofessional' conduct to be convinced that these grounds are as broad, if not even broader, than those with which we are here concerned.

"It is to be noted that in the foregoing case (engaging as real estate broker without a license) the statute involved set up no standards on what the examination should cover and no qualifications for applicants for a license other than that he should be of 'good moral character, honest and trustworthy.' Yet, we declined to sustain the contention that the act was bad because too vague or indefinite in this particular, or amounted to an unlawful delegation of legislative power to an administrative board. There is no distinction in principle between that case and this one.

"They (counsel for the two engineers) argue that without an enumeration of particular acts which constitute 'gross negligence, incompetency, or misconduct,' sufficient to authorize revocation of license, the governing board is invested with unbridled discretion to do so on any fancied ground, however absurd or trivial, if it chances to meet the fancy of the board members.

"Many cases from other jurisdictions sustain similar language in acts regulating engineering and other professions against charges similar to that here made aaginst ours, namely, that it represents an unlawful delegation of legislative power to an administrative board.

(After reviewing a series of cases involving the same points in other jurisdictions, the Supreme Court referred to the recent book on Professional Engineering Registration Laws by A. L. McCawley, which was published with the cooperation and support of NSPE.)

"In a roll call of some 40 states and territories to be found in the work by McCawley, it is disclosed that several of the acts regulating professional engineers include the same ground for revocation as exists in New Mexico. In none of them is any effort made to define 'gross negligence, misconduct or incompetency.'

"It is our considered judgment that the questioned language in the statute is not an unlawful delegation of legislative power to the governing board and we so hold. The trial court erred in ruling otherwise.

"It follows from what has been said the judgment reviewed is erroneous and must be reversed. The cause will be remanded to the district court with a direction to set aside its judgment and enter a new one affirming the action taken by the governing board . . . revoking the licenses. . . ."

* * *

The Supreme Court rejected the argument that the engineers were not allowed to present evidence in their defense against the charges brought against them. "The fact is, and it fairly appears from the record before us, that orders to show cause with copies of the charges against them were served on each plaintiff, noticing the matter for hearing before the board at a time and place described in the notice; that pursuant to such notice both of them appeared accompanied by their counsel and proof supporting the charges was adduced. They were given every opportunity to put on evidence. Instead of doing so, they chose to move for a continuance to some future date to produce evidence in their defense. This motion, the board denied. They then protested against the holding of any hearing, upon the ground that the board lacked jurisdiction to proceed for various legal reasons presented to the board. The fact that plaintiffs saw fit to produce no evidence may not fairly be charged to any action of the defendants. They offered plaintiffs the opportunity to do so and the latter declined to avail themselves of it."

Charles D. Harris of Roswell, New Mexico, who represented the state registration board as a special assistant attorney general, forwarded a copy of the decision to NSPE at the suggestion of his brother, Hollis W. Harris, P.E., a member of the Texas Society of Professional Engineers and a longtime member of NSPE. Because of the importance of the decision to other states and the fundamental principles involved, the following statements from the lawyer's letter of transmittal to NSPE are quoted:

"I have spent a considerable portion of the last year working on this case and have become tremendously interested in the relationship between engineers and society.

"Like all other professions worthy of the designation 'profession' the engineering profession is becoming increasingly concerned with standards of professional conduct. I have met with several engineering groups during the last year to discuss this problem, and feel that the maintaining of professional standards and the punishment for breach of the standards are the most important problems fac-

(*Continued on page 46*)

book looks

The Book: **The Techniques of Supervision**

The Author: **Alfred R. Lateiner**

The Publisher: **National Foremen's Institute, Inc., New London, Connecticut**

Price: **Cloth Bound, $4.00; Paper Bound, $2.00 (two or more copies).**

Reviewing the Book: **Frank W. Edwards, P. E., Manager, Chicago Office, Stanley Engineering Co., Consulting Engineers, and recently appointed to the Board of Engineering Consultants, St. Lawrence Seaway.**

THE author explains his reason for writing this book in the following words:

"In recent years I have conducted conferences with many groups of supervisors in companies throughout the country. Frequently the men have asked me to recommend books on the job of supervision. I have earnestly searched the book shelves for useful reading material for the supervisor. My findings are that while many excellent books exist on management and supervision, they are mostly in the style, language, and viewpoint of the top executive and staff man. I hope this book will, to some degree, fill the need for a basic and readable source to which the supervisors in business and industry may turn for help, guidance, and inspiration."

At the outset he traces briefly the gradual restriction of authority of the old time foreman who hired and fired at will, set hours and wages, and generally ran the shop. As authority and responsibility were taken away and given to the personnel manager and other specialists morale and efficiency suffered. It is realized now that efficient operation requires that responsibility for accomplishments of a group must be placed in one person. Supervisors have again regained certain stature. Instead of giving them power to set policy they are given authority to interpret it to the persons under them in the organization. They have become the clearing agency for all instructions, thus avoiding the confusion of divided responsibility.

Unfortunately selection of supervisors often is based on tenure or on expertness in some field unrelated to supervision. Neither of these situations necessarily contributes to success as a supervisor. Tenure possibly and expertness certainly indicate satisfactory performance as an individual, but the supervisor is paid not for his individual productive capacity but for his ability to get others to maintain a high level of accomplishment.

The author claims supervisory principles can be learned. Probably this is true, but whether or not they can be practiced successfully after they are learned depends on many characteristics of the supervisor, not the least being genuine interest in people and sincerity in helping them develop their individual talents.

This may be classed as a "how to" book. Chapters and headings throughout the book explain how to produce results. There is a disadvantage to this approach when compared to one which develops basic principles of psychology to be applied as the supervisor recognizes the need. Supervisory problems which arise are never exactly like the situations explained in the book.

The author has directed his attention primarily to foremen who supervise employees performing physical labor. Most examples cited in the book apply to this group. Supervisors, those who implement the policies established by management, in many corporations include employees from the president down. This emphasis on foremen does not signify that the junior supervisor or others in higher echelons will find nothing of value for them.

Attention is called to certain differences and certain likenesses among people. They are different in three areas:

a. The way they think—mental traits
b. The way they feel—emotional traits
c. The way they act—muscular traits

These differences make the supervisor's task difficult. Unlike the strictly technical problems of engineering dealing with irrevocable laws of nature, many of the problems of human behavior defy solution. The science of behavior is largely unknown although important advances have been made in recent years. But allowances must be made by the supervisor for the differences among individuals if he is to obtain their cooperation. As the author says, "He (the supervisor) should be a bit of engineer, psychologist, teacher, accountant, and industrial expert."

On the other hand certain likenesses among people may be exploited by the supervisor in order for him to perform his function of maintaining production continually at a high level. The author says people are alike in four ways. They:

a. Want to be part of a group
b. Resist change
c. Want to feel important
d. Desire approval of others

The first of these opens the way for developing teamwork. The second suggests that changes should be preceded by sufficient conditioning and advance notice. The last two indicate the need for the supervisor to explain the importance of the individual's work and to be liberal with praise for work well done.

Psychologists would add also that people are inclined to imitate; therefore, the supervisor should set a good example.

"Eight Ways to Win Cooperation" and "Five Ways to Improve Morale" are chapters which are followed by others on discipline, accident control, training methods, work simplification, and similar subjects.

The author has extensive experience in conducting supervisory training courses for more than 40 companies.—***End.***

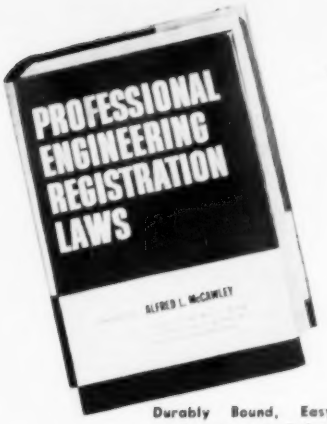
Meet the Reviewer . . .

Mr. Edwards

Frank W. Edwards, now manager of the Chicago office of the Stanley Engineering Company, consulting engineers, as well as a member of the Board of Engineering Consultants for the St. Lawrence Seaway, has long been noted both as a civil engineer and an engineering educator.

He holds three degrees from the State University of Iowa. In addition to positions with various engineering firms, he has worked with a number of U. S. Government agencies, particularly in connection with various major flood control projects; and he has been chief of hydraulic design and research for the third locks of the Panama Canal. His teaching career has included professorships at the Pennsylvania State College, Carnegie Institute of Technology, and the Illinois Institute of Technology. He was formerly director of the Department of Civil Engineering at the latter school.

Active in many professional and technical societies, Mr. Edwards is a past president of the Chicago Chapter of the Illinois SPE. He is also the author of numerous articles published in engineering journals.



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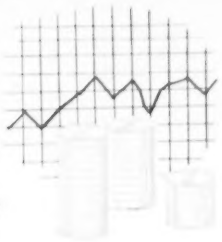

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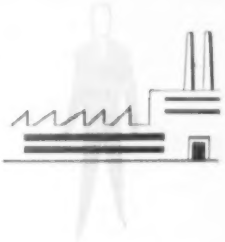

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NSPE Opposes TVA In "Outside" Engineering Activities

The NSPE has called upon a Senate subcommittee to eliminate language in a pending TVA financing measure which would permit TVA to provide engineering services to non-TVA groups.

The measure, introduced by Senator Kerr of Oklahoma, is being considered by the Senate Public Works Subcommittee on Flood Control and would authorize TVA to issue bonds to assist in financing its power program.

The Society stated that a section of the bill would permit TVA to furnish engineering and construction services to outside agencies or organizations if they were to build and operate power facilities or any other facilities with a tie-in to TVA operations.

In a letter to the Committee, Allison C. Neff, NSPE president, said that such action would be "unwarranted interference with the normal functions and operations of private consulting engineers who have been and are available for such normal professional activities."

Neff said that the Federal Government should not compete with its own citizens in furnishing materials or services to non-Federal agencies or persons, particularly with respect to the independent practice of the professions.

The engineering society president also pointed out to the subcommittee that the action of TVA in furnishing engineering services to non-Federal agencies would be in conflict with state engineering registration laws which make it unlawful for any person to offer or perform professional engineering services unless registered under the appropriate state law governing the practice of engineering. TVA, he said, is not licensed under any of the state laws to offer and perform professional engineering services for others.

"We urge the subcommittee," he said, "to delete the authorization and thus indicate its faithful adherence to the principles of non-interference by the Federal Government into private professional pursuits and compliance with existing state law designed to protect the public's life, health and property."

The complete text of the letter follows:

Honorable Robert S. Kerr
Chairman, Subcommittee on Flood Control
—Rivers and Harbors
Senate Public Works Committee
Senate Office Building
Washington 25, D. C.

Dear Senator Kerr:

The National Society of Professional Engineers, representing 36,000 members, through 39 Member State Societies and more than 350 local community Chapters, has had brought to its attention certain provisions of S. 2373, "To amend the Tennessee Valley Authority Act of 1933, as amended, and for other purposes," which are of considerable concern.

We understand that the Subcommittee will shortly conclude its public hearings on the pending legislation and we would respectfully request that our views, as contained in this letter, be included in the record of the hearings.

Section 15d. (g) of the amended Tennessee Valley Authority Act of 1933, as amended, as proposed in S. 2373, would authorize TVA—

"In connection with the construction of a generating plant or other facilities under an agreement providing for lease or purchase of said facilities or any interest therein by or on behalf of the Corporation, or for the purchase of the output thereof, ***(to) *perform engineering and construction work* and other services, and may enter into any necessary contractual arrangements." (Emphasis added.)

It would appear that the quoted language would permit TVA to furnish engineering and design services in connection with the design and construction of a generating plant or of any other facilities for anyone. It would appear that such a result could occur, for example, if any private or local agency were to build and operate power facilities or any other facilities with a tie-in to TVA operations.

We respectfully submit that a grant of authority to TVA which would allow it to render engineering design services for others is unwarranted interference with the normal functions and operations of private consulting engineers who have been and are available for such normal professional activities. We believe, and we think the members of the Committee agree, that the Federal Government should not compete with its own citizens in the furnishing of materials or services to non-Federal agencies or persons, except under the most extreme or emergency conditions. Maintaining and strengthening the private enterprise system which has made this country so powerful and prosperous requires that we keep the Federal Government out of pursuits which are provided normally by private organizations or individuals. This is particularly urgent with respect to independent practice of the professions.

The offer and furnishing of professional engineering services is subject to the state engineering registration laws which are in existence in every state of the United States and its territories and possessions, as well as the District of Columbia. These state laws provide for the registration of qualified professional engineers under strict standards in order to protect the public health, safety and welfare, and they make

TVA - Engineered Chickamauga Dam. Will the Authority offer engineering services outside its area?

it unlawful for any person to offer and perform professional engineering services who has not complied with and registered under the appropriate state law.

The grant of authority to TVA, quoted above, would conflict with the state engineering registration laws, as it is certain that TVA as a Government Corporation is not licensed under any of the state laws to offer and perform professional engineering services for others.

The National Society of Professional Engineers does not wish to indicate any opinion on other aspects of S. 2373, but it is felt that the authorization for TVA to provide engineering services outside of its own organization would be a serious intrusion by a Federal agency into private professional practice and would be at variance with the letter and spirit of existing state laws.

We urge that the Subcommittee delete the authorization discussed above and thus indicate its faithful adherence to the principles of non-interference by the Federal Government into private professional pursuits and compliance with existing state law, designed to protect the public's life, health and property.

Very truly yours,
/s/
Allison C. Neff, P. E.
President

New Book Covers Invention Process

The publication of a new, 28-page booklet, *Progress Through Invention*, has been announced by the Cleveland Engineering Society. The booklet, which is available from the Society (2136 East 19th St., Cleveland 15, Ohio), at a cost of one dollar, contains reprints of six talks given during the organization's first Invention Exhibit and Conference.

Professional Education Is Theme of Book

Education for the Professions is the title of a new book published by the Office of Education of the U. S. Department of Health, Education, and Welfare. The book gives a general review of the educational standards and requirements for the various professional fields, including engineering.

Paper-backed copies are available from the U. S. Government Printing Office, Washington 25, D. C., for $1.75 per copy.

Standards Engineers Plan Meeting

The Standards Engineers Society has announced that it will hold its fourth annual meeting at the Statler Hotel in Hartford, Connecticut, from September 29 to October 1 inclusive.

It is suggested that members of NSPE or others who wish to attend this conference and want further information contact: Mr. Arnold B. White, Veeder-Root, Inc., 25 Sargent Street, Hartford, Connecticut.

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The development, according to Victor engineers, simplifies the construction of nuclear hot cells, the number of which is growing rapidly as more and more university and industrial research centers move into atomic inspired research and engineering experimentation in many product fields.

Atomic hot cell installations are shielding chambers, about room-size, in which radio-active materials are worked or handled in machining and other types of operations. The work within such hot cells is done by remote control through systems of mechanical arms and hands which extend through sealed entrances into the hot cell and function through levers and manipulators.

Because of the necessity for close supervision of work within a hot cell, both visually and mechanically, the thickness of the protective walls which shield the radio-active materials is of extreme importance. The thinner the wall, the easier the operation. Nearly any dense material, according to Victor engineers, is considered a good absorber of radiation. Many different materials were tested. Ordinary concrete with a density of only 150 pounds per cubic foot proved undesirable because hot cell shielding walls of it would have to be six to eight feet in thickness. Low grade iron ore and other ores such as barytes were tested but the maximum obtainable density was only between 200 and 220 pounds per cubic foot.

Scrap steel, shot and steel punchings produced a dense concrete, but segregation in such mixes occured, seriously affecting the workability of the mix. In some tests rusting was found which caused deterioration in the strength of the finished shield.

Ferrophosphorus, however, produced a density of 290 to 300 pounds per cubic foot and showed excellent workability and no segregation in working, pouring or setting. Being a chemically inert material, the resulting concrete protective shields are insoluble in acids and will not rust.

Small Gas Generator For Jet Horsepower

A gas generator hardly bigger than a can of soup, yet capable of producing about 850 jet horsepower, has been developed by the General Electric Company's Aircraft Gas Turbine Development Department.

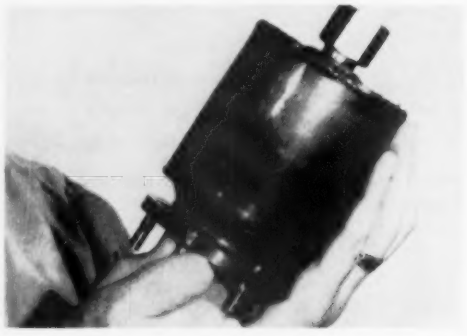
D. Cochran, manager of the Department, said the gas generator was developed for application to guided missile propulsion systems, but that it is ideal for many applications where a portable, light-weight, and reliable source of energy is required.

Using no moving parts, the gas generator is designed to convert liquid hydrogen peroxide into a high pressure, high temperature gas stream of free oxygen and steam. This gas stream, or jet as it is called, may then be directed against a turbine wheel and the rotative power thus generated may be used in the same manner as any turbine-generated power.

Weighing less than 3½ pounds, and only about four inches long by three inches in diameter, the gas generator produces about 850 jet horsepower in its designed guided missile application. "Jet Horsepower" is a term used in the rocket field to express the energy in the high velocity jet.

Department engineers say jet horsepower from the same unit has been varied from as little as 50 to about 1800 by simply adjusting the incoming liquid flow rate, and that operating life requirements from a few seconds to hours can be designed into a unit.

Possible industrial applications of the gas generator include use as a source of energy for rotating machinery, as a thrust simulating device for static tests of airplane or missile models, or as a quick and reliable source of steam, Department engineers said.



No larger than a man's hand, the miniature gas generator developed by the GE Aircraft Gas Turbine Development Department offers a portable, light-weight source of energy.

TV Screens For Traffic Safety In Tunnel

Deep in a half-mile highway tunnel piercing a West Virginia mountain ridge motorists are as close to the outdoors as the nearest television set—and the closest one is but a few feet away, extending an invisible helping hand from entry to exit.

Camera and monitoring equipment produced by the Dage Television Division of Thompson Products, Inc., 23555 Euclid Avenue, Cleveland 17, Ohio, keeps a sharp electronic eye on the lookout as an extra safety feature for the scores of automobiles daily traversing the Memorial Tunnel near Charleston on the West Virginia Turnpike.

Four cameras are suspended at intervals above the tunnel roadway, one covering the entire length and the others focused for "close-ups" along the route. The pictures "overlap" so that a motorist is always "seen" by at least one camera.

The images are flashed over the closed-circuit system to four receivers, or monitors, installed in an office at one end of the tunnel. Here two turnpike employees scan the monitors and can control the traffic stream from a desk chair.

The observers know from watching the Dage screens whether traffic is moving smoothly and whether all control and roadway conditions are normal.

Tennessee Society Set for NSPE Fall Meeting

The Convention Committee of the Memphis Chapter, Tennessee Society of Professional Engineers, has scheduled regular weekly meetings for the perfection of its plans for the Oct. 14-15 Fall Meeting of the National Society of Professional Engineers.

Under the leadership of Lorin Allen, chairman, and Robert H. Hoshall, co-chairman, the committee is planning for an anticipated 300 attendance. Special entertainment is being arranged for wives of visiting engineers by a committee of the Ladies Auxiliary, Memphis Chapter, TSPE, headed by Mrs. John C. Brough, Jr., president.

—Ladies' Program—

Thursday, Oct. 13

5-12 p.m. Ice Breaker; 3rd floor, Hotel Peabody

Friday, Oct. 14

9 a.m. Meet on the 3rd floor, Hotel Peabody to select choice of tour:
1. Gardens
2. Stores
3. Historical places of Memphis

12:45 p.m. Luncheon and Fashion Show . . . Hotel Claridge. Price $2.00.

6:30 p.m. Social hour and banquet.

The Tennessee Society plans to hold its Fall Meeting in conjunction with the national affair. In addition, the Arkansas SPE has been invited, and special invitations are being sent to professional engineering groups in Mississippi, Louisiana, and Kentucky to attend open sessions of the national meeting. These three groups are not now members of NSPE.

An Executive Committee meeting has been scheduled for Thursday, Oct. 13, on the tentative program. This will precede the opening of the professional meeting at 9 a.m., Oct. 14, in the Skyway Room of the Peabody Hotel, at which time President Allison C. Neff will preside.

Mayor Frank T. Tobey of Memphis will welcome the visitors at the opening session.

At 12:30 p.m., six luncheons for the NSPE's regional groups will be held in various meeting rooms at the Peabody. Vice presidents of the regions will be in charge.

Planning for the Fall Meeting, seated, left to right, are: Paul E. Gieselman, civilian engineer with the Corps of Engineers; Robert A. Hoshall of Allen and Hoshall; and Mrs. John C. Brough, Jr., president of the Ladies' Auxiliary. Standing, left to right, are: Harry Woodbury of Archer and Woodbury, assisting local committee in public relations; Lyman G. Winn, sales engineer; L. H. Lanahan, engineer with Tri-State Armature & Electrical Works; Warner Howe of Gardner and Howe, vice president of the NSPE; Lawton Sumner, chief engineer, Fischer Lime and Cement Co.; John C. Brough, Jr., of John C. Brough Co.; and G. Drennan Albrecht, manager, Memphis Municipal Airport.

Professional practices will provide topics for the second session beginning at 2 p.m., Oct. 14, along with national defense and public relations.

A social hour is planned for 6:30 p.m., Oct. 14. It will be followed by a banquet at 7:30 p.m. in the ballroom at the Peabody.

The program for Oct. 15 will begin at 9 a.m. in the ballroom at the Peabody and will be concerned primarily with inter-professional relations, chapter activities and membership.

A luncheon is scheduled for 12:30 p.m. in the Skyway Room at the Peabody, and the 2 p.m. sesion involving the operating and services group will be held in the ballroom.

Committee chairmen and others working with Mr. Allen in preparing for the meeting are:

Reservations — Robert H. Hoshall, chairman, Allen & Hoshall, and Warner Howe, Gardner & Howe.

Publicity — Drennan Albrecht, chairman, manager of Memphis Municipal Airport.

Exhibits — Lawton Sumner, chairman, chief engineer of Fischer Lime & Cement Co.

Program—Larry Jaseph, chairman, chief engineer of Rotary Lift Co.

Entertainment — Jack Edwards, chairman, vice president of the Southern Company, Inc.

Tri-State Planning — John C. Brough, Jr., chairman, John C. Brough Co., structural engineers, and Gene Bespalow, vice pres. and chief engineer of the Choctaw Culvert Co.

Registration—Lyman Winn, chairman, sales engineer who heads his own firm.

Printing—Paul Gieselmann, chairman, civil engineer with the Corps of Engineers at West Memphis, Ark.

Finances — L. H. Lanahan, chairman, Tri-State Armature & Electrical Works.

Have you checked these in the Classified section?

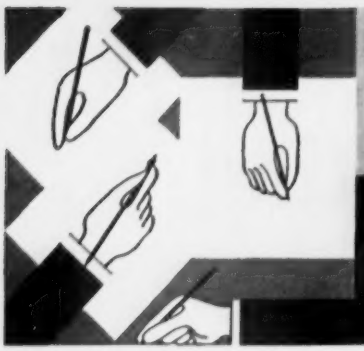
- √ **Business Opportunities**
- √ **Help Wanted**
- √ **Positions Wanted**
- √ **Training Courses**

Check Classified, page 47.

With the Ladies

Memphis Auxiliary members will serve as hostesses at registration and will provide information on good restaurants and places to go in Memphis.

(Please turn to page 46)



Professional POSTSCRIPTS

Mr. Colin Carmichael, editor of *Machine Design*, must have many readers who also are —PP— devotees, for we frequently receive letters from AE readers who send his editorials to us. We think the latest Carmichael effort is a particularly good one to pass along and we do so here. It is entitled, "Sterility at the Grass Roots."

—PP—

How well are today's engineers measuring up to the concepts of a profession? "Professionalism in any area of endeavor," says W. H. Larkin, "is strictly a grass roots affair. It is basically a way of life, an understanding of the nature of a profession, a realization of its responsibilities, and a willingness to assume a fair share of them."

By at least one criterion—membership in engineering professional societies—the answer is discouraging. Fewer than half of those qualified belong to any such society. And even fewer are registered by their states to practice engineering.

Active membership in a professional society costs a little money and some time and effort. Why do more than half of our so-called profession refuse to pitch in even to that small extent, if only as a gesture and a token of their professional spirit? Because, they say, the societies don't do anything for them. Instead, some of them are joining collective bargaining groups.

But disinterest in professional societies and in registration is only half the story. In Mr. Larkin's view, "Altogether too many individuals in both groups have no conception of what constitutes professional attitude nor what their responsibilities are. The profession is all too sterile at the grass roots, the only level at which vital lasting growth can take place."

A favorite excuse for our shortcomings is "after all, people are only human." Yes, but in defining *professional* the dictionary includes the words "higher motives than mere gain." If he wants to take a lower level of human conduct as his standard, the engineer had better forget about striving toward professional recognition.

Engineering stands at a crossroads. Where our profession goes from here lies in the hands of each and every individual who calls himself an engineer. If we fail to achieve the recognition that engineers' contributions to human welfare so richly deserve, it will be largely because of sterility at the grass roots.

—PP—

Mr. James H. Smith, P.E., an NSPE member from Denver, Colorado, has taken pen in hand and written us a few pages on the subject of registration. As we all know, of course, NSPE is the only group which requires registration for membership and, again, as we all should know, the Society was probably the leading fighter over the years for strong registration laws. We think it is quite apropos, then, to reprint Engineer Smith's remarks below.

—PP—

Registration of engineers, and the regulation of the practice of engineering has already done much. And when properly applied, it holds even greater future prospects for the elevation of the status of engineers, and the protection of public interests. In this zeal for registration and licensing, however, lies an element of danger unless a few fundamental principles are recognized and strictly adhered to when licensing laws are considered.

One of the first principles that we must recognize is that, while we all ardently desire to increase the standing and prestige of the profession, the needs and desire of the general public with which we deal must first be considered.

The mere banding together to promote the welfare of one group of people, engineers or otherwise, cannot in itself accomplish the desired result unless this movement has the backing of the general public. That it takes more than a law to make a closed profession is amply demonstrated by the record of the medical profession.

The practice of medicine is generally regarded as a closed profession. And while it is generally true that regulation has unquestionably raised the standing of the profession, it is also true that this regulation has also given birth to a veritable horde of chiropractors, Chinese herb doctors, faith healers, and just plain quacks, who practice and flourish like the proverbial green bay tree under the very noses of the legitimate medical profession. The reason for this is plain—their services are demanded by the public.

Secondly, we must recognize that engineering as a profession cannot possibly be confined to the narrow channel of professional activity enjoyed by many other professions. Even in the field generally covered under the heading of civil engineering, there exists a multitude of divisions and subdivisions requiring a different approach to each. A truly excellent construction engineer, for example, may possess hardly a single qualification necessary for even mediocre success in highly technical design.

A registration law, to truly serve the needs of both the public and the profession, must be so drafted and administered as to preclude the possibility of the unqualified attempting to practice the profession. But it must also be so drafted and administered as to preclude the possibility of a truly qualified person being in any manner disqualified because of artificial barriers, such as preconceived and untested ideas regarding educational requirements.

It is generally true that a candidate for professional registration should at least possess a B.S. degree in his chosen field. We have constantly before us, however, such outstanding examples to the contrary as to shake our faith in the infallibility of this yardstick. For, had this rule been inflexibly employed in the past the civil engineering profession would have lost the invaluable services of John F. Stevens and Robert Ridge-

way, both past presidents of the American Society of Civil Engineers, and many other men of truly outstanding ability. Also if this rule were in use today, the profession would stand to lose the services of many outstanding engineers who are today making engineering history in spite of formal educational handicaps. The names of many of these men could now be mentioned were it not feared that this mention might prove embarrassing to them.

Were the registration of engineers entirely governed by the ability to solve the more intricate problems encountered in engineering teaching and research, many successful practicing engineers would fail to qualify, especially some years after graduation. For, in the day by day practice of engineering a great deal of higher mathematics is not usually involved and the ability of the engineer to solve ordinary engineering problems depends more upon his ability to use handbooks, charts, and the specialized knowledge of authorities combined with a liberal sprinkling of common sense, than upon a deep and involved knowledge of mathematics and science. In fact, many men of outstanding managerial ability in engineering are not outstanding mathematicians or scientists.

It, therefore, devolves upon the framers and interpreters of registration laws to take a truly fearless and impartial stand when the qualifications of candidates are being considered, and to recognize the fact that academic accomplishments are not necessarily engineering accomplishments or vice versa.

Registration laws in the various states should be so standardized that an engineer licensed in one state should be automatically eligible for license in any other state. The very fact that an engineer may be qualified in one state and disbarred in another tends to discredit the profession as a whole.

The rather nomadic nature of engineering practice demonstrates the absurdity of local and regional barriers being erected against men who of necessity must serve where service is needed. The individual ability of the engineer as determined by impartial and qualified boards of registration, rather than the state of his nativity, should be the only criterion of his ability.

Under United States law no national registration is possible, this power being reserved to the individual states. Uniform laws can be secured only through the framers of these laws and the engineers themselves.

The time is ripe for engineers, through their national, state and regional societies and clubs, and as individuals, to reach a meeting of the minds and to bring about a uniformity in registration procedures in the United States which will guarantee a qualified professional engineer the right to step across the boundary of any and all states and practice his profession without danger of becoming involved in legal complications, sweating out a long waiting period, or engaging in mental gymnastics with a complicated test which may or may not contain many questions not in any way related to his particular branch of practice.

—PP—

From out in St. Louis a —PP— reader has sent along to us an editorial from that leading paper of the Midwest, the St. Louis *Post-Dispatch*. The editors have called it "Two Ways to Get Needed Engineers." You may agree with the writers or you may not—why not drop a note to —PP— and give us your opinion? Remember, —PP— was created to give you, its readers, a Platform from which to speak, and at length, if necessary. How about getting a few of your thoughts down on paper?

—PP—

West Virginia Society of Professional Engineers—Annual Meeting, September 22-24, 1955, Fairmont Hotel, Fairmont, W. Va.

Virginia Society of Professional Engineers — Annual Meeting, October 6-8, 1955, Roanoke Hotel, Roanoke, Virginia.

NSPE Fall Meeting — October 14-15, 1955, Peabody Hotel, Memphis, Tenn.

Missouri Society of Professional Engineers—Annual Meeting, October 21-22, 1955, Kentwood Arms Hotel, Springfield, Missouri.

North Dakota Society of Professional Engineers—Annual Meeting, November 4-5, 1955, Dickinson, North Dakota.

Arkansas Society of Professional Engineers — Annual Meeting, November 18, 1955, Marion Hotel, Little Rock, Arkansas.

There have been repeated warnings in recent months that the United States is falling farther behind Soviet Russia in the graduation of youths from colleges of engineering. Yet the national security rests largely on scientific manpower in this age of electronics and atomic power.

Figures for June graduation indicate that the engineering schools will produce about 27,000 engineers. Soviet Russia is expected to do as it did last year—add at least two and a half times as many engineers to its ranks. Already Russia has 400,000 engineers, it is estimated, while the United States has 500,000. That is why the Committee on Manpower Resources for National Security has warned: "The margin of skilled manpower for expanded war production is extremely narrow in the light of modern requirements."

University and college heads have pointed out that many hundreds of high school graduates apply to enter engineering schools only to be rejected as unqualified. One reason is because of a national shortage of good science teachers in high schools, from which many able instructors have been diverted by better paying jobs in industry. The only answer to this is to make it attractive for teachers to stay in classroom and laboratory.

Another way to gain scientists and engineers—and one that would yield quick results—would be to ease the immigration laws so that more foreign engineers and technicians could enter. Too many people forget that Albert Einstein, Enrico Fermi, Edward Teller and Leo Szilard were foreign-born.

Either of these methods of increasing our scientific manpower would be easy to achieve. An aroused public opinion could make the difference. Time is growing short.

—PP—

Designed for Service . . .

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New Literature
What's New

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A+ for ACHIEVEMENT

Do Outstanding Engineering Students Keep on Going Places After They Leave College?

How Do They Prove the Professors Were Correct in Giving Them Top Scholastic Ratings?

BROTHER Amandus Leo, F.S.C., P.E., dean of engineering at Manhattan College in New York, is the educator bestowing this month's A+ for Achievement Citation in the AMERICAN ENGINEER series on outstanding engineering students who have set exceptional records following graduation.

"It is a difficult task," Brother Leo writes, "to select only one student. There have been dozens of students in these years who have been outstanding." Making a representative selection, however, he points to:

Warren J. Dornhoefer
Littleton, Massachusetts

Brother Leo Comments:

"Warren entered the Manhattan College School of Engineering in 1939. There was little doubt that the youngster would succeed academically. Warren had a brilliant high school record. He entered Manhattan on a full tuition scholarship from the College as well as a New York State Regents Scholarship. He continued his academic brilliance as a student at Manhattan. At the end of four years he had a cumulative index of 3.85 out of a possible perfect 4.0. He graduated with first honors and he was the winner of a host of prizes at Commencement in 1943. . . .

"It was not Warren's academic achievements alone which made him outstanding in my mind. His pleasant personality, his love of fun and immense interest in the extra curricular activities on the campus made him one of the most popular students in the College. . . .

"His rapid success since graduation comes as no surprise. Dornhoefer went on to further academic achievement at Yale University and in the Navy during World War II.

"Following the war, he came back to Manhattan to teach; then to the Ward Leonard Electric Company, Mt. Vernon, N. Y., as senior development engineer; over to Vickers Electric Division, St. Louis, Mo., as section head in the Engineering Department; then to the Regulator Equipment Corp., Paterson, N. J., first as vice president for Engineering, and then three years ago, at the age of 31 years, taking over as president.

Brother Leo

"On May 16 of this year, he became president and principal executive officer of The Warren Manufacturing Company, Inc. (formerly McElroy Manufacturing Corporation) of Littleton, Massachusetts, an electrical manufacturing firm engaged in research, development, design, and manufacture of telecommunications equipment.

"It is not hard to see why Warren J. Dornhoefer, Class of 1943, is my choice for a truly outstanding student, man and engineer."

(Last of a Series)

Brother A. Leo

TWO STORIES ON CORPORATE PRACTICE:

Appeals Court Rules Out Corp. License

The United States Court of Appeals for the District of Columbia has affirmed a lower court ruling that a corporation, even though composed exclusively of registered professional engineers, may not obtain a license to practice. (AE, Feb., 1955.) The appeals body said it agreed with the ruling of the District Court that the D. C. law applies only to natural persons and that the registration board was correct in its position that a corporation is not entitled to registration.

District Court Judge Holtzoff had ruled that the language of the law pertaining to qualifications for registration showed clearly that natural persons only were intended to be covered. He added, ". . . traditionally only natural persons can be charged with the moral responsibility that the practice of a learned profession requires. While traditionally the learned professions have been regarded as the law, medicine and the ministry, I think that engineering, too, may properly be included in that class."

Missouri Tightens Requirements

A general revision of the Missouri engineering registration law has amplified the conditions which permit corporate practice. Under the new statute, professional practice of engineering is deemed a personal right, based upon the qualifications of the individual, but corporations may practice after obtaining a certificate of authority from the registration board.

The corporation, under the revised law, must assign responsibility for the proper conduct of professional practice to an officer of at least the rank of vice-president who must be registered in the state or in another state with substantially equivalent requirements. In addition, the person or persons in responsible charge of the professional activities of the corporation must be registered in Missouri,

The above conditions apply equally to corporate practice of engineering and architecture.

SEPTEMBER MEETINGS Of Note

Construction Surveyors Institute—East Coast Conference, September 1-2, Hotel Roosevelt, New York City.

American Institute of Electrical Engineers—Electrical Conference of the Petroleum Industry, September 12-14, Shamrock Hotel, Houston, Texas.

American Road Builders' Association—National Conference of County Highway Engineers and Officials, September 12-14, Greystone Hotel, Gatlinburg, Tennessee.

Instrument Society of America—Tenth Annual Instrument-Automation Conference and Exhibit, September 12-16, Shrine Exposition Hall and Auditorium, Los Angeles, California.

Illuminating Engineering Society—National Technical Conference, September 12-16, Statler Hotel, Cleveland, Ohio.

Association for Computing Machinery—1955 Annual General Meeting, September 14-16, Moore School of Electrical Engineering, University of Pennsylvania, Philadelphia, Pa.

Society of Industrial Packaging and Materials Handling Engineers—1955 Packaging and Materials Handling Short Course, September 19-21, New York University College of Engineering Campus, Bronx, New York.

American Institute of Chemical Engineers—Conference, September 25-28, Lake Placid Club, Lake Placid, New York.

American Society of Mechanical Engineers—Petroleum-Mechanical Conference, September 25-28, Roosevelt Hotel, New Orleans, Louisiana.

Atomic Industrial Forum and American Nuclear Society—Annual Fall Meeting (plus First U.S. Trade Fair of the Atomic Industry), September 26-30, Sheraton-Park Hotel, Washington, D. C.

Standards Engineers Society—Annual Meeting, September 29-October 1, Statler Hotel, Hartford, Connecticut.

Jurisdictional Row In Canada

The familiar problem of jurisdiction as between the legal practice of engineering and architecture was recently faced in a Canadian court.

A firm of consulting engineers in Toronto proposed to design an office building and stated that the owner would not need to employ an architect separately as the firm, though primarily consulting engineers, employed qualified architects. The Ontario Association of Architects filed a charge against the engineering firm for violation of the architects' registration law.

The charge was dismissed by a lower court and on appeal it was held that the provision of the law permitting engineers and architects to practice in each others' field when the work is incidental to the main function justified the action of the engineering firm. The court observed that there was no definition of "architecture" in the law, but that the definition of "professional engineer" specifically covers "steel, concrete and reinforced concrete structures."

In holding for the engineering firm,

(Continued on page 49)

NSF Survey Cites Manpower Shortage In New Report

"The supply of qualified research scientists and engineers in the United States falls far short of industry's needs," Dr. Alan T. Waterman, director of the National Science Foundation, has declared in releasing a new report entitled *Shortages of Scientists and Engineers in Industrial Research.*

The report, prepared for the Foundation by the U. S. Department of Labor's Bureau of Labor Statistics, is based on interviews with officials of approximately 200 large companies which employ well over half of the Nation's industrial research scientists and engineers. At least half of the companies reported that they were unable to hire enough research scientists and engineers to meet their needs, and one out of three reported major or substantial shortages of such personnel. The remaining half did not report numerical shortages of research personnel, but many of them emphasized their need for better-qualified engineers and scientists.

The aircraft, electrical equipment, petroleum, paper, food, and primary metals industries reported the largest shortages. Within all other industries, however, at least some companies said that their research programs were not impeded by a lack of engineers or scientists.

The demand for additional research personnel extends to all levels of experience and training, although most company officials said they had a great er need for engineers and scientists with experience or advanced degrees than for new graduates with only the bachelor's degree.

Lack of sufficient scientific and engineering personnel was reported, in many instances, to have hindered companies in carrying out going research programs. A sizable, though smaller, number of firms said they had been forced to curtail projected increases in their research and development activities.

The study on which these findings are based is part of a national survey of research and development resources being made by the National Science Foundation. The particular findings with respect to personnel shortages will be issued shortly by the Foundation as *Scientific Manpower Bulletin No. 6.*

Early Planning for 1956 Engineers' Week Underway

Preliminary planning and production work on promotional materials for National Engineers' Week, February 19-25, 1956, is already well underway, according to an announcement from Anatole R. Gruehr, chairman of the NSPE Public Relations Committee.

Mr. Gruehr stated that information is now being compiled from questionnaires on the uses and values of the material in the promotional kits sent out from the National Society for the 1955 National Engineers' Week observance.

The two-page questionnaires were sent to all chapter presidents with a letter of transmittal asking that they be filled out by Engineers' Week Committee Chairmen for the 1955 event.

Answers given on the questionnaires, Mr. Gruehr said, would be used in determining the type of material to be included in the kits for the 1956 program.

PR Chairman Gruehr told the *American Engineer* that the sponsors for the 1956 Week have been selected, and that letters to newspaper publishers, major banks and insurance firms, associations, and other business houses would be made in the early fall. The letters will outline the purposes of the Week and ask for cooperation in its events.

Here are the sponsors for the 1956 National Engineers' Week:

VANNEVAR BUSH
President
Carnegie Institution of Washington

ALLEN B. DuMONT
President
Allen B. DuMont Laboratories, Inc.

CHARLES F. KETTERING
General Motors Corporation

CLARENCE H. LINDER
Vice President
General Electric Company

THOMAS E. MURRAY
Commissioner
U. S. Atomic Energy Commission

ROYAL W. SORENSEN
California Institute of Technology

PHILIP SPORN
President
American Gas and Electric Co.

DAVID B. STEINMAN
Consulting Engineer

CHARLES ALLEN THOMAS
President
Monsanto Chemical Company

ROBERT E. WILSON
Chairman of the Board
Standard Oil Company of Indiana

Mr. Gruehr stated that local chapters and state societies would receive the promotional kits in October. An "Action Letter" will supplement the material in the kits and will be mailed to all NSPE affiliates at regular intervals, beginning in September.

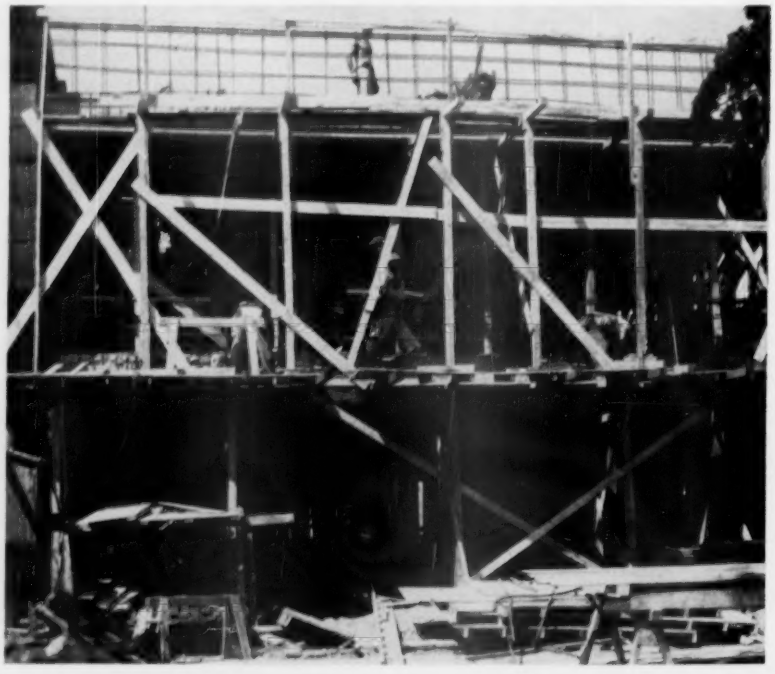
Radio and TV promotional aids will again be offered by the National Society. An order blank listing prices for such aids will be mailed out with an early "Action Letter."

There will be tape recorded programs for radio use and a series of one-minute spot films for TV. All of these programs will deal with the contributions made by the engineering profession to our modern way of life.

TV slides showing the National Engineers' Week poster design will also be offered.

A feature of the 1956 Week will be a special dinner sponsored by NSPE in Washington, D. C., in conjunction with the Board of Directors meeting to be held in that city during Washington's birthday week. Leading engineering and political figures will be honored at the dinner.

Dedication ceremonies for the new NSPE headquarters building in Washington will also be held during the week of February 19-25.



"Construction Report No. 2" reveals that excellent progress is being made on the new National Society Headquarters Building. (See above.) Latest word from the contractor indicates that the fourth floor will be poured before this issue of the *American Engineer* reaches the hands of its readers. The next report will probably show the structure ready for inside work and finishing. The date of occupancy, January 1956, will be realized if the present pace continues.

Members are reminded that approximately $90,000 must still be raised to complete the financing of this project. Officials urge all members to obtain a financial stake in the Society's new Headquarters Building. Subscription forms and offering circulars may be obtained by dropping a note to the Washington office. Do not delay—enter your subscription today!

With Our Members . . .

Informality Reigns

Engineers Close Summer Season With Picnics, Golf Parties, Other Events

Informality has been the keynote of many of the summertime chapter meetings recently reported to National Headquarters as the engineer members and their families enjoyed various social events scheduled in place of regular professional and business meetings. Picnics, golf parties, and similar outings were the order of the day from the East to the West Coast as the engineers brought the summer season to a close and prepared to embark on a busy fall and winter program involving professional meetings, special chapter projects, and preparations for the 1956 National Engineers' Week, which has been scheduled for February 19-25.

The Buffalo Launch Club was the scene of a day-long P.E. outing on July 27 for members of the Erie County Chapter, their families, and guests. Swimming, baseball, and other sports were enjoyed by those attending the event which was climaxed by a roast beef dinner served in the main dining room of the club in the evening.

Cedar Point Park in Lorain County, Ohio, was the location chosen for the August 20th family picnic of the Lorain County Chapter. In addition to enjoying sports activities and dancing to Vic Stuart's orchestra from Cleveland, the picnickers were also treated to an aerial act as a special feature of the day's program.

Approximately 185 engineers and their guests attended the annual picnic of the St. Louis Chapter of the Missouri SPE, which was held earlier in the season. An impressive number of P.E.'s were also on hand for the annual barbecue sponsored by the Birmingham District Chapter of the Alabama Society of Professional Engineers on July 28.

Plans for the July 23rd golf day of the Capital Chapter of the Illinois Society were organized by A. Senter, as program chairman, assisted by E. Hurst and A. Rosche. The event was held at the Hillsboro Country Club in Springfield, and canasta games were arranged for the non-golfers.

The third annual summer festival of the Toledo Society of Professional Engineers, held at the Toledo Edison Club on the Maumee River on July 19, was one of the more formal social events of the summer. Dance music was played by Fred Wood and his orchestra, and there were corsages provided by the chapter for the ladies. In addition, a buffet dinner was served to the guests.

The members of the Stanislaus Chapter of the California Society scheduled their annual family picnic at the Cherry Valley Dam for the second straight year. Following the picnic lunch, fishing, and other sports events, the members and their guests were also conducted on a tour of the construction now in progress at the Dam. The event was held on August 27.

Presidents' Workshop In Ohio

Thirty chapter officers of the Ohio Society of Professional Engineers and eighteen student chapter officers were participants in the OSPE's second annual "Presidents' Workshop," which was held recently at Ohio Northern University in Ada.

Hosts for the day-long conference of chapter leaders were: Lawrence H. Archer, dean of engineering at Ohio Northern University; William Sholl, president of the Maumee Chapter; and James F. Campbell, president of the Ohio Northern Student Chapter.

Chicago P.E.'s Honor New Registrants

Newly registered professional engineers of the Chicago area were honored at a banquet on August 16 sponsored by the Chicago Chapter of the Illinois Society of Professional Engineers. The dinner was held at the Chicago Engineers Club, and certificates of registration were presented to the honorees by Vera M. Binks, director of the Illinois Department of Registration and Education.

. . . more news on page 41

FLORIDA ANNUAL MEETING—The pictures below were taken during the recent Annual Meeting of the Florida Engineering Society in Daytona Beach. The photo at the left shows the Society's officers for the current term. Left to right, they are: Harvey F. Pierce of Miami, president; John B. Miller, Jacksonville, vice president; Thomas S. Bransford, Gainesville, secretary; and Russell DeGrove, Jacksonville, treasurer.

Examining a model of a nuclear reactor in the photograph at the right are (left to right): James Barr, Jr., assistant director of raw materials for the Atomic Energy Commission; Joseph Weil, dean of the College of Engineering at the University of Florida; and John C. Reed and Thomas Furman, both engineering professors at the university in Gainesville. Dean Weil was one of the major speakers at the FES meeting.

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Chapter Officers' Meeting Scheduled In Michigan

L. M. Dunn, president of the Michigan Society of Professional Engineers, has announced the completion of plans for the semi-annual Chapter Officers' Meeting to be held at the Kellogg Center, Michigan State University, in East Lansing on September 17.

The meeting has been organized in cooperation with the University's Department of Continuing Education. F. L. Hendrick, MSPE secretary, and J. D. Ryder, dean of the University's Engineering School, made the arrangements.

Textbook Prepared On Agricultural Engineering

J. W. Martin, head of the Department of Agricultural Engineering at the University of Idaho, Moscow, Idaho, has announced that his new textbook, *Introduction to Agricultural Engineering*, will be published about September 10. Mr. Martin, who is a member-at-large of the National Society of Professional Engineers and a leading engineering educator in the agricultural field, has written the book for use by freshman or sophomore students.

Publisher of the new textbook is the Mc-Graw-Hill Book Company.

Pres. Eisenhower's Talk

Recently, the President of the United States delivered a commencement address to the graduates of Pennsylvania State University. Because so much of the message is of significance to engineers and the profession, we are pleased to print several of the more pertinent passages below.—*Editor.*

"Progress to date in nuclear science is not, of course, exclusively an American achievement. An international cooperative effort broke the barriers and made possible man's use of atomic energy. For maximum progress in the future, we must work for a continued partnership between the world's best minds—in science, engineering, education, business and the professions."

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"In this country we emphasize both liberal and practical education. But too often it is a liberal education for one and a practical education for another. What we desperately need is an integrated liberal, practical education for the same person—for every American youth who can possibly obtain its blessings. Hand and head and heart were made to work together. They must work together. They should be educated together."

"To gain proficiency, sometimes even world acclaim in a specialized skill or profession, knowledge and training are the principal requisites. But to understand how one skill fits into another, how one profession complements and depends on another, how all human enterprises constitute an immense, interdependent society—only education can develop that understanding."

Gen. Grant

(*Continued from page* 14)

ods permitting the construction of immensely high buildings, and many other engineering developments, have produced a multitude of new problems for the city planner as well as the engineer, and have threatened our cities with the realization of Jefferson's fear that our people might be "piled high up on one another in cities." For a time our cities seemed to merit Cowper's reference to:

". . . cities humming with a restless crowd,
Sordid as active, ignorant as loud,
Whose highest praise is that they live in vain,
The dupes of pleasure or the slaves of gain;
Where works of man are clustered close around
And works of God are hardly to be found."

It is the writer's hope that the foregoing may apprise his brother engineers of the importance of the work they are doing in the building of American cities, the seats of our culture, and of the importance of their keeping in mind the need for consideration of the inevitable effect of their works on the city and its inhabitants as a whole, so that they may be sympathetic with the limitations that sound city planning must at times place on their designs, in order that their works may be so adjusted to the overall city plan as to ensure delight and consequent permanence. It was indeed with the wisdom bred of experience that our well-known Nelson P. Lewis wrote, in dedicating his book, *Planning the Modern City*, to the "municipal engineers of the United States, the first men on the ground in city planning as in city building, in the hope that it may help them to realize their responsibilities and opportunities in determining the manner in which cities will develop."—***End.***

About the Author . . .

Gen. Grant

Major General Ulysses S. Grant, III (ret.), grandson of President U. S. Grant, is an internationally-known authority on city planning and is currently president of the American Planning and Civic Association. He is a graduate of West Point (1903) and the U. S. Engineering School (1908), and he has had a distinguished career in military service with the Corps of Engineers.

General Grant has also served as chairman of the National Capital Park and Planning Commission, and he has been a vice president of George Washington University. He is a fellow of the American Geographic Society and a member of the Society of American Military Engineers, the American Institute of Planners, and many other patriotic, military, and social clubs and organizations. He holds the Distinguished Service Medal and the Legion of Merit (U. S.), plus decorations from six foreign countries.

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A three-part series entitled, "So You Want to Open a Consulting Office . . .", featuring the advice of John B. McGaughy, Alfred J. Ryan, and Francis S. Friel, all leaders in the consulting field and NSPE members. Mr. McGaughy's article on background requirements will inaugurate the series.

STRICTLY BUSINESS

Personalities . . . The appointment of **William E. Dickinson** to the position of chief engineer of the **Calcium Chloride Institute,** Washington, D. C., has been announced by **G. H. Kimber,** president. . . . **R. Charles Jester, Jr.,** president and general manager of **Allstates Engineering Company,** Trenton, N. J., has announced the appointment of **Emery B. Kerekes** as chief engineer and member of the company's executive committee. . . . **L. D. Deere** has joined the **Lone Star Tank Co., Inc.,** Dallas, Tex., as general manager. . . . The **Chesapeake and Ohio Railway Company,** Richmond, Va., has announced the following engineering appointments: **T. H. Duffy,** general fuel service engineer, Huntington, W. Va.; **A. S. Morton,** fuel service engineer, Richmond, Va.; and **C. S. Dennis,** assistant fuel service engineer, Greensboro, N. C. . . . **W. H. Yahn** has been named general manager of the Fresno, Calif. Modification Center of **North American Aviation, Inc.,** while **L. G. Witwer** takes his place as director of contract administration at the firm's Columbus, Ohio Division. **H. R. Shaw** has been appointed senior assistant to the director of North American's Electro-Mechanical Engineering Department at the Downey, Calif. plant. . . . **Ken R. Gerlach** has been appointed executive vice president of **Bogue Electric Manufacturing Co.,** Paterson, N. J., according to **E. P. Schinman,** president.

Mr. Dickinson

The following new appointments for the Crusher Engineering Division of **Poor & Company,** Philadelphia, have been announced by **John A. Plimpton,** vice president: **Forest Neely** has been named director of development; **John Kessler, Jr.,** is now chief engineer; and **John Dellevigne, Jr.,** has been appointed, manager, Parts Service. . . . **Mel E. Maurer,** a leading aeronautical engineering executive, has been named president of the Inkster, Mich. Flex-O-Tube Division of **Meridan Corporation.** . . . **George H. Garraway** has been appointed director of manufacturing of **The New York Air Brake Company,** according to **Charles T. Zaoral,** president. . . . **Earl Mendenhall,** president of **Sterling Electric Motors, Inc.,** Los Angeles, has announced the appointments of **Edgar K. Johnston** as vice president of manufacturing and **John R. Eastman** as chief engineer. . . . **H. D. Palmer,** president of **Detroit Steel Products Company,** has announced the appointment of **E. A. Miller** as general manager of the firm's Fenestra Building Panel Division in charge of engineering, sales, and production for light gage steel and aluminum structural products. . . . **William L. Sheets** of Los Angeles has been appointed a construction manager of **Stone & Webster Engineering Corporation** and will transfer his headquarters to the firm's Boston office.

Mr. Maurer

New Firms . . . **Adolf R. Hopf** and **Albert Bertalott** have announced the opening of an office at 1505 Race St., Philadelphia, under the firm name of **Hopf and Bertalott,** Industrial Engineers and Management Consultants . . . Announcement has been made of the opening of the offices of **Q. Vallei,** Consulting Engineer, at 1831 Chestnut St., Philadelphia, specializing in the design of reinforced concrete, steel, and timber structures, and other engineering, estimating, and consulting services. . . . **Fraser, Weir and Associates, Inc.,** have opened offices at 20 North Wacker Drive, Chicago, as consultants in industrial engineering and plant design with emphasis on installation of controlled maintenance systems. The firm represents an affiliation of the **Paul Weir Company** of Chicago and **H. H. Fraser and Associates** of Johannesburg, South Africa. Officers are: **Paul Weir,** chairman of the board; **Hugh H. Fraser,** president; **Stewart Morgan, Clayton G. Ball,** and **Harold E. Hastings,** vice presidents; and **John S. Snyder,** comptroller.

Changes of Ownership . . . **Barry Controls Incorporated** of Watertown, Mass., has acquired the **Insco Company** of Groton, Mass., as the first step in a major diversification program, according to **Ervin Pietz,** Barry president. . . . **Harry Frohman,** president of **Frohman Manufacturing Company, Inc.,** has announced the purchase of the Turbine Products Division of the **Detroit Broach Company,** including its plant and equipment at Boca Raton, Fla. Frohman operates other plants in Miami and Fort Lauderdale for the manufacture of gears and gear assemblies for aircraft, missiles, and precision instruments. . . . Acquisition of the equipment, inventory and personnel of the **Robey Rotor Company,** Culver City, Calif., manufacturers of gyroscopes, blowers and miniature motors for aircraft and guided missiles, by the **J. B. Rea Company,** Santa Monica electronics firm, has been announced by **Dr. James B. Rea,** president. . . . Acquisition of **Kesko Products, Inc.,** of Bristol, Ind., has been announced by **Aluminum Products Co.,** Houston, Tex. Both firms are manufacturers of aluminum windows. **Ward P. Kessler,** former president of the Bristol firm, now becomes president of **Aluminum Products Co.; William Hopkins** is chairman of the board.

Operational Expansion . . . Formation of a new Special Defense Projects Department within the **General Electric Company's** Atomic Energy and Defense Products Group has been announced by **C. W. LaPierre,** G-E vice president. **George F. Metcalf** has been named general manager of the department, which will have its headquarters in Schenectady, N. Y. . . . **Panellit, Inc.,** Skokie, Ill., has announced the formation of a new Instrument Services Division to provide consulting and installation services.

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Lois McDowell Heads Society of Women Engineers

Mrs. Lois G. McDowell, assistant professor of mechanical engineering at the Illinois Institute of Technology, Chicago, has been elected national president of the Society of Women Engineers for 1955-56. She was the first woman to receive a master's degree in mechanical engineering at Illinois Tech and one of the first four women engineers accepted for training by Rensselaer Polytechnic Institute, Troy, N. Y.

Two women members of the National Society of Professional Engineers are among the other newly-elected officers of the SWE. They are: Dorothea H. Perry of Pittsburgh, Pennsylvania, who was named vice president, and Marie Reith of New York, who was elected one of the Society's directors-at-large.

In addition to Mrs. McDowell, Miss Perry, and Miss Reith, the other 1955-56 officers include: Doris M. Gainor, Los Angeles, California, treasurer; Roslyn K. Gitlin, New York City, corresponding secretary; Martha J. Bergin, Boston, Massachusetts, recording secretary; and Miriam M. Gerla, New York City, and Dorothy Merrill, Chicago, also directors-at-large.

Industrial Safety Group Elects J. B. Davies

John B. Davies, manager of industrial sales, Mine Safety Appliances Company, Pittsburgh, was elected president of the Industrial Safety Equipment Association at the group's recent annual meeting.

Mr. Davies, a graduate of Carnegie Institute of Technology, first joined Mine Safety as a chemist in 1919. He is a member of the American Society of Safety Engineers and other groups.

Institutes

(*Continued from page* 18)

For comparison, beginning engineering jobs, checked in like manner at the end of the first year, show approximately the same results. A survey of 114 Bachelor of Science Degree men show that 56 per cent of their first jobs were technological skills, 16 per cent psychological skills and 28 per cent manual skills, again, rather closely the same proportion of one-half, one-fourth and one-fourth.

These percentages of skills change as the technician and the engineer advance and would be reflected in new specifications.

There are some 100 accredited or approved courses in ten fields in which engineering technicians have become prominent and in which technician employment opportunities have demanded course development. These fields include aeronautical design, maintenance and production; air conditioning, heating and refrigeration; architecture and building construction, civil technology; electronics and radio-television; electrical power and control; instrumentation and watchmaking; metal fabrication and tool design; photographic; and steam, diesel and automotive technology.

THIS type of instruction is in the broad area of technical education that lies between professional engineering on one side and vocational education on the other and is conducted by several types of institutions. Curricula are offered by one or more schools in the following categories:

Technical institutes, endowed or publicly supported.

Junior colleges offering terminal programs.

Evening sessions and extension divisions of colleges and universities.

Proprietary schools, operated by individuals or corporations.

Schools or training divisions associated with industries.

Specialized schools operated by divisions of government.

Correspondence schools.

Courses are from one to three years in length but generally require two academic years of full-time study. High school graduation or equivalent is needed for admission and most courses have specific additional matriculation concerned—opportunities for the young man, prosperity for the industry, and satisfaction to the educator—all in the interest of maintaining a strong and healthy nation.—***End.***

requirements. These programs are briefer and more technical in content than are professional engineering curricula. They include a heavy schedule of specialized technical subjects which are balanced with a program of related studies in mathematics, physical sciences, and engineering drawing. English, economics, human relations round out most schedules. Such courses generally lead to an associate degree.

WHAT is the future of such a technical institute course in America? The pattern of successfully established programs has two basic, distinguishing factors. First, a technical institute curriculum is planned around the technical specialty, balanced by a neatly integrated combination of supporting subjects, geared to dynamic industrial requirements. This suggests an ingenious approach to curriculum construction, a learned, experienced and practical faculty, specified laboratory facilities and unique teaching technics. Second, the engineering technician, in executing his work is a part of management. His educational experiences, of necessity then, should take this in account.

Both of these salient factors suggest close relationships between the technical institute educator, the professional engineer and the industrialist who employs the technical institute graduate. It should be a challenging experience in their newly found relationship for the cause of higher education, jointly to plan, finance and execute technical institute programs that serve the best interests of all

About the Author . . .

Mr. Werwath

Karl O. Werwath, president of Milwaukee School of Engineering, has had a lifelong affiliation with the engineering profession. Born March 1, 1909, he is the son of the late Oscar Werwath, founder of the school and president until his death in 1948.

Karl Werwath was graduated from Milwaukee School of Engineering with an electrical engineering major in 1936. He did further study at Northwestern University and at the University of Wisconsin, returning to MSOE in 1938 as assistant registrar. He was then successively instructor, registrar and vice president before succeeding his father as president in 1948.

He is currently vice president of the Milwaukee section of the Wisconsin Society of Professional Engineers and serves as secretary-treasurer of the Technical Institute Division of American Society for Engineering Education. He is a past president of the National Council of Technical Schools, a director of the Milwaukee Rotary Club and is president of the Milwaukee Executives Club. He has recently been nominated as president-elect of the new Technical Institute Foundation.

Court Rules Firm Must Change Name

The Graham Engineering and Manufacturing Company, of Little Rock, Arkansas, must drop the word "engineering" from the name of the company under the terms of a decree from the Chancery Court of Pulaski County, Arkansas.

The court order followed the institution of a suit by the State Board of Registration for Professional Engineers, charging that the company's use of the word "engineering" was in violation of the state engineering registration law. The court said that under the provisions of the state law, ". . . the defendant, by use of the word, 'Engineering' in the name of his business, and on letterheads, signs and telephone book listing holds himself out to the public as being a registered engineer. The defendant is not registered pursuant to the provisions of the . . . act." The court order enjoined the company from continuing the use of the word, "engineering" in connection with the name of the business or in any other manner that indicates qualification under the laws of the state to render professional engineering service.

R. G. Graham, owner of the company, said he was a graduate engineer but had not represented the firm as being engaged in professional engineering. He said the term applied to engineering work in connection with the manufacture of kitchen appliances.

The state registration board has entered another case of a similar nature, this one against the Utility Rate Engineering Company, objecting to the use of the word, "engineering," in the name without one of the owners or incorporators being registered in conformance with the Arkansas law.

La. Contractor Must Stop Engr. Work

A consent judgment has been entered against a general contractor in Louisiana who had been charged with preparing plans and working drawings for the construction of rice dryers, rice storage plants, and other similar large structures. The contractor, Curtis McDaniel of Crowley, La., was not registered under the state engineering registration law.

The decision by the 15th Judicial District Court for the Parish of Acadia flowed from a complaint by the state engineering registration board. The board said that it felt "that the prestige of our engineering profession and the Engineering Registration Law was at stake in this case and that every effort possible should be exerted to prevent this violation and bring the case to a successful conclusion."

The defendant agreed that he was in violation of the registration law and submitted to an injunction prohibiting the practice or offer to practice of professional engineering in any of its departments in Louisiana, and more specifically from planning, designing and supervising the construction of structures. The registration body has agreed that in cases of doubt the contractor may present facts to the board which will give him its opinion as to whether the proposed course of action is in violation of the registration law.

Survey of Labs Now Available

A survey of the work of independent laboratories in the construction field has been conducted by the American Council of Independent Laboratories, Inc., the professional society of independent laboratories in Washington, D. C.

The survey is presented in chart form showing 24 areas of construction testing and inspection performed by individual laboratories. Each classification is established to conform with standards required by the applicable Federal specifications and the American Society of Testing Materials.

Categories in the survey include the testing and inspection of structural steel, concrete, masonry building units, wood products, paint, adhesives, rubber, plastics, investigation of foundation soils and road and paving materials.

The survey was developed in cooperation with the U. S. Veterans Administration. Arrangements for its distribution have been made with the advice of the Department of Construction of the Chamber of Commerce of the United States, the Building Materials and Construction Division, Business and Defense Services Administration of the U. S. Department of Commerce, the Federal Housing Administration and a score of other national organizations.

Further information concerning the survey may be obtained by writing to Dr. Harold M. Dudley, Executive Secretary, ACIL, 4302 East-West Highway, Washington 14, D. C.

Meeting

(*Continued from page* 31)

Thursday evening the local group will entertain out-of-town guests with an informal party at the Peabody.

Friday morning the visiting ladies will be taken on privately conducted tours of the city, viewing garden spots, historical places, or going on shopping tours, according to their personal choice.

At 1 p.m.. Friday, a luncheon revolving around the theme, "Cotton Is King," will be held in the beautiful Empire Room of Hotel Claridge. Included on the menu will be tasty Southern fried chicken, one of the area's best-known dishes. Guests will be presented souvenir cotton bales and cotton boll corsages.

A fashion parade of the latest styles in winter cotton frocks will be presented by Julius Lewis. Stars of the show will be two nationally known Memphis beauties — Mrs. John V. Hummel, the former Miss Barbara Walker, who reigned as "Miss America of 1947," and Mrs. Billy Marks Hightower, the former Miss Hilma Seay, who traveled at home and abroad as "Maid of Cotton" in 1947.

After luncheon, those who wish may remain to play cards at the Claridge. Others who prefer may spend the afternoon shopping. In the evening they will join the men for the gala convention cocktail party and banquet.

New Mexico

(*Continued from page* 25)

ing the profession. This is true equally with the other learned professions, such as law and medicine.

"It appears that many engineers feel that the various state laws regulating the practice of engineering and setting up standards for revocation of licenses may be unconstitutional, since the various legislatures have not defined the terms gross negligence, incompetency, or misconduct. The enclosed opinion should prove to be an important precedent in determining the constitutionality of the various acts.

"Almost every other state has a registration act identical to or closely similar to the New Mexico statute. Justice Sadler's well-reasoned and forthright opinion should go a long way toward settling the uncertainty concerning these laws."

Math

(*Continued from page* 21)

troduction to plane or solid geometry. He's never studied physics or chemistry. He has no knowledge of foreign languages. Outside of cutting up a frog in biology lab, he has never even strayed into the great field of systematized knowledge where the sciences are deployed."

The *Humboldt Times* in Eureka, California, had this to say: "As a new school year approaches there comes to the editorial desk a letter from the National Society of Professional Engineers which contains a warning and an appeal that should be of serious concern to educators, to high school students and, for that matter, to the general public."

After a full length editorial devoted to a discussion of the NSPE communication, the writer expresses his agreement that the questions raised in the letter are "timely and appropriate," and should be given "serious and reflective thought."

Not all the newspapers agreed that their communities showed a decline in high school interest in mathematics. In Lansing, Michigan, the *State Journal* found that local schools were reporting an increasing interest on the part of students in the sciences and mathematics over the past five years.

The NSPE headquarters office has received a number of letters from newpaper publishers stating that they have instructed their editorial departments to investigate the question of high school interest in mathematics in their circulation areas.

One publisher, John S. Knight, who publishes the *Chicago Daily News*, the *Akron Beacon Journal*, and papers in Detroit and Florida, incorporated the NSPE letter into a speech which he made before a Chamber of Commerce group in Akron, Ohio.

In an effort to intensify the public relations value of Mr. Neff's letter to the publishers, NSPE has distributed a news release concerning the project to a mailing list of technical and professional publications, associations, and government offices.

The news release has appeared in publications in the engineering field and in *Editor and Publisher* magazine, a large circulation journal in the newspaper and publishing business.

Massachusetts P.E.'s Publish Guidance List

The Educational Committee of the Massachusetts Society of Professional Engineers is preparing to publish a leaflet listing all ECPD-accredited engineering schools, recognized courses, and entrance requirements.

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Architect or Engineers—Experienced graduate to supervise school construction for architectural firm. Either resident position or one with considerable traveling in connection with several projects. Throughout Michigan or within 100 mile radius surrounding Chicago. Salary dependent upon qualifications. Give summary of education and experience, with salary expected. Box 904A, AMERICAN ENGINEER.

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Write for application blank to Consoer, Townsend & Associates, 351 East Ohio Street, Chicago 11, Illinois.

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and related products required by nationally known manufacturer of materials handling equipment. Salary plus yearly bonus.

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Write giving full particulars concerning education, experience, personal history and availability, to:

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The following positions are listed with The Ohio Engineers' Placement Service, Inc., address below:

Positions Available

MECHANICAL-ELECTRICAL Engr. This is a supervisory of maintenance position —of property & machinery. Also supervision of installation of new equip. Two fine hotels have 700 rooms completely air-conditioned; a good knowledge of air-conditioning is necessary. Because of the diverse nature of their maintenance problems, it is essential that they have a man that is good at systems and methods. Some designing ability is required. The salary will be in the neighborhood of $10,000 to start but there is room for salary improvements commensurate with results. (335-N-1)

CONSULTING ASSOCIATE Grad CIVIL Engr. Age 45-50. On associate basis with two Consultants who wish to expand their services. Must have some consulting exp. plus a good background as Chief Engineer, Highway Dept.; or with a firm as a partner. One who commands prestige in his specialty and possesses a record of accomplishments in the field of Highway Engineering, Structural Engineering, and if possible strong on Expressways and Freeways. (336-N-1)

OPPORTUNITIES IN PRODUCTION ENGINEERING — Grad MECHANICAL, ELEC., CHEMICAL, CIVIL and CERAMIC Engrs. Choice of six plants throughout the U.S. Assignments will involve a solution of production problems dealing with maintenance, repair and installation of equip. With development more specific responsibility will be given for: Equipment improvement; design of changes; maintenance & fabrication responsibilities, and specification and procurement of new equip. Challenging problems in furnace design & maintenance, power & construction, instrumentation and automation. Will carry project from inception to accomplishment. 2-5 yrs. ind. exp. preferred. Salary $400-$600 depending upon exp. (147-SC-20)

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...NEW LITERATURE...

To help the offering firms determine which literature you require, when requesting an item, be sure to list all specifications shown . . . and say you saw it in the AMERICAN ENGINEER.

HIGH PRESSURE EQUIPMENT—High Pressure Equipment Company announces Catalog No. 2055 which describes the rapidly expanding line of high pressure valves, adaptors, reactors, autoclaves, thermocouplings, gauges, fittings and tubing. Copies available from High Pressure Equipment Co., Commerce Building, Erie, Pa.

—AE—

FINISHING TECHNIQUES — A new, eight-page bulletin on current finishing techniques applied to magnetic materials such as silicon-iron, nickel-iron and aluminum-iron alloys is now available. The two-color publication, illustrated with schematic drawings, graphs and photographs outlines the latest manufacturing methods employed in the field of high permeability magnetic alloys. Discussion includes design and operation of modern, high-precision processing equipment, including rolling mills, gang slitters and roller levelers. The bulletin is available from Stanat Manufacturing Company, Inc., 47-28 37th Street, Long Island City 1, N. Y.

—AE—

SEWAGE FLOW MEASUREMENT—Builders-Providence, Inc., Division of B-I-F Industries, Providence, R. I. has reprinted an article by Walter H. Brown and George E. Symons entitled "Flow Measurement in Sewage Works." Complete with photos, tables and easy-to-read flow diagrams and dimension sheets, this twenty-page reprint is in three chapters: (1) Fundamentals (2) Principal Devices Used and (3) Secondary Instruments, Controls, Operation, and Maintenance. For your free copy of Ref. No. B-I-F M39 write Builders-Providence, Inc., 345 Harris Ave., Providence, R. I.

—AE—

SCREENING ACTION—Bulletin 243, eight page, two colors, describing the Symons V-Screen is announced by Nordberg Manufacturing Co. This screen is specifically designed for fine screening, sizing, dewatering, dedusting, cleaning, and washing. Unique in its construction and operating characteristics, not dependent on gravity alone for its screening action. Bulletin tells how the Symons V-Screen multiplies its screening effect by combining centrifugal and gravitational forces for high capacity and sharp, single cut, wet or dry separations. Operational data demonstrate successful application in sand and gravel, stone, coal, ore, slag, non-metallic minerals, chemical, grain, and food product plants. Bulletin 243 is available, free upon request. Write Nordberg Manufacturing Company, Milwaukee 1, Wisconsin.

—AE—

AIR CLEANERS—Trion, Incorporated has prepared an Application Study on the use of electronic air cleaning in a Consulting Engineer's office. Describes methods for heating & cooling, plus air cleaning to eliminate graphite dust, tobacco smoke and normal atmospheric air contaminators. Request from Trion, Inc., 1000 Island Avenue, McKees Rocks, Pa.

BUS BARS—The use of aluminum bus bars in both feeder and plug-in or trolley busway distribution systems is described in a new two-color, eight page bulletin issued today by the Distribution Assemblies Department of the General Electric Company. The publication lists the advantages resulting from the use of aluminum as a conductor in busway applications. It explains in detail construction features, operating characteristics, and specifications. Copies of this new G-E bulletin (GEA-6169) are available from Advertising & Sales Promotion, Distribution Assemblies Department, Plainville, Conn.

—AE—

SCREENING CATALOG—The new 1955 SWECO Separator Catalog released by Southwestern Engineering Co. features photos, drawings and detailed specifications of equipment now successfully screening more than 241 different materials. The company has collected application data in the following industries: Stone, Clay, Glass, Food, Chemicals, Lumber, Textile, Paper, Petroleum, Metals, Rubber, Waste and Pollution control. A complete data file will accompany this catalog with information directly pertinent to the interests of each inquirer. Request Catalog 112-368 from Southwestern Engineering Co., 4800 South Santa Fe, Los Angeles 58, Calif.

—AE—

SPECIALTY STEELS—A new 32-page, illustrated guide to specialty steels, issued by The Carpenter Steel Co., is now available. The booklet defines the distinctive characteristics of a broad range of special purpose steels in terms of end use. Covers tool and die steels; stainless steels; silicon and high nickel electrical alloys; special purpose alloy steels; valve, heat-resisting and superalloy steels, tubing and pipe in various analyses and fine wire specialties. Write: The Carpenter Steel Company, 3051 West Bern Street, Reading, Pa.

—AE—

ALFAX NEWS — Alfax Paper and Engineering Company announces the first edition of "Alfax News," a company publication appearing when there is important news to be told. This edition carries the story of the European Trade Fair, at Hannover, Germany. The inside pages tell the story of how Alfax Paper—"Electricity in the Ink"—and Alden Adjusterless Recording Techniques open new horizons in Direct Visual Recording. Many of the areas of use for Alfax and much of the equipment made possible by Alfax is described. Anyone desiring a copy and having his name placed on the mailing list for future issues should write to: Mr. Charles Sviokla,, Dept. 180, Alfax Paper and Engineering Company, Alden Research Center, Westboro, Mass.

Have you checked the Classified ads?

. . . page 47

NEW TABLES & DATA — The United States Testing Company, Hoboken, New Jersey, announces publication of a new booklet entitled "Selected Scientific and Engineering Tables and Data." Issued in commemoration of the company's 75th anniversary, the booklet is composed of many kinds and types of technical information, reflecting many fields of activity. This 112-page paper-bound volume contains selected Chemical & Physical, Engineering, Plastics, Bacteriological, Leather, Psychometric and Textile tables and charts, arranged for easy reference. Interested individuals may obtain a copy by writing on their company letterhead to H. M. Block, Vice President, at the Hoboken main laboratory, or to the Branch Manager of any of the Testing Company's branch laboratories.

—AE—

MEASUREMENT — Maddox & Hopkins have issued a brochure entitled "A Syllabus of Measurement" which is described as "a pictorial outline of the Science of Measurement yesterday, today and tomorrow." Describes and illustrates types of ancient and modern measurement methods and instruments. Available from Maddox & Hopkins, Consulting Engineers, 8506 Dixon Ave., Silver Spring, Md.

—AE—

WELDING EQUIPMENT—The Air Reduction Sales Co. has just announced the availability of a new 16-page catalog featuring Aircomatic (Airco's inert-gas-shielded metal arc welding process) welding equipment. Manual and automatic units along with accessory apparatus and welding wire are included in the illustrated booklet. A copy may be obtained by writing Air Reduction Sales Co., 60 East 42nd Street, New York 17, N. Y.

—AE—

V-BELTS—The complete line of Maurey Mor-Grip Fractional Horsepower and Heavy Duty Multiple V-Drive Belts are described in a new 3 color, 24 page catalog just released. The Multiple line consists of Super, Steel Cable, Open End and Hexagon V-Belts as well as V-Link Belting. Each type of V-Belt is completely described as to its construction and applications. A copy of the catalog may be obtained by writing direct to the Maurey Manufacturing Corporation. 2907-23 South Wabash Ave., Chicago 16, Ill.

—AE—

AIR CONDITIONING AND REFRIGERATION—A new 4-page, 2-color bulletin, offered by the Patterson-Kelley Co., Inc., gives detailed descriptions of dry expansion Freon and storage coolers, condensers, and p-k's patented slug eliminator and balance loader, all designed and fabricated to meet ASME code requirements. Available in a wide range of sizes, will fit practically any commercial or industrial cooling application. For free copies of Bulletin No. 4001, write to The Patterson-Kelley Co., Inc., 10 Lackawanna Ave., East Stroudsburg, Pa.

Westinghouse-Johns Hopkins Awards Go to 36

The largest class in the four-year history of the Westinghouse-Johns Hopkins Awards leading to careers in engineering was announced with the naming of 36 high school graduates recently as winners in the 1955 competition.

The three-year program of part-time employment in industry combined with classroom study at the Johns Hopkins University's McCoy College leads to a certificate of engineering for the participants. The program offers more than $1200 worth of courses at the college.

The majority of the winners came from the Baltimore area, but there were also winning competitors from Pittsburgh, Pennsylvania, and Little Rock, Arkansas. Thirty of the group have just graduated from high school; four had already started college; while two were at work in industry. The selection of the winners was made on the basis of aptitude tests, school records, and teachers' recommendations.

The student trainees who began the new program late in June, are employed in the engineering departments of the four Baltimore area Westinghouse plants, working a 32-hour week at scale wages while they are also taking the McCoy College courses.

Letters

(Continued from page 4)

your readers as to their interpretation of the clause above referred to, and what custom of usage is under it.

SAMUEL H. HIMELSTEIN,
Grand Rapids, Mich.

Duty . . .

Dear Editor:

I am particularly pleased that you published a brief resume of the NSPE Conference held in Philadelphia, June 2 (AE, July, 1955). It is up to us to do something [further] about [these problems].

In his famous address, "The Second Mile," Doctor Wickenden stressed the obligation to give public service. Are we meeting this obligation or letting self interested pressure groups steal the show?

As noted on page 45 of the July issue, Representative Carroll D. Kearns advised us to take a serious interest in the type and quality of education being given in the elementary and secondary schools. Why should we surrender our rights and duties as citizens to the graduates of the teachers' colleges? I, for one, do not think they have all the answers. I am pleased that some fellow engineers feel as I do.

It would seem that all of our chapters might organize committees to act as "watch dogs" on this important question. Why should we remain inarticulate on a question so important to our national welfare?

It is true that our nation was founded on the principle of our individual liberties. Let us be realistic in the organization of our primary and secondary school curricula. Let us teach our children how to think.

We should not organize our courses at the level of the lower segment of our population. We should not teach our children to waste time, when it is getting so late.

"For every right there is a corresponding duty." Let us awake and do our duties.

CARROLL D. BILLMYER, P. E.,
Kingston, Rhode Island

Canada

(Continued from page 35)

the court said that the two professions overlap to a great extent and that it is usual for engineers to employ architects and architectural firms to employ engineers. The judge said: "I cannot but think that it was the intention of the legislation to give reciprocal privileges, at least to the extent necessary to cover the facts disclosed, and that it is up to a client to weigh the qualifications of firms of Architects and Engineers and decide which he wishes to employ, or if he wishes to employ both, which is indeed a common practice . . . I can find nothing in the words of the legislation which enables the court to draw . . . a line between the two professions, and I do not think that the court should endeavor to do so until the Legislature passes appropriate provisions."

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What's New

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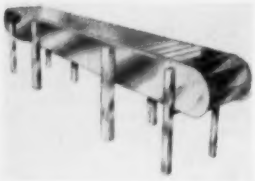
PRE-FABRICATED ALUMINUM CONVEYOR — Item 1



The new PRE-FAB *all aluminum* CONVEYOR was designed to help reduce the cost for handling unfinished and finished goods. Sagless and vibrationless belt-plate top will handle and safely convey parts quickly and efficiently; at variable speeds up to 100 feet per minute in either direction. Each foot of belt is supported by 8 or more rollers, conveyors 18" and wider have an added center channel support for greater load capacity. Belts are available in widths from 6 to 96 inches and in lengths up to 175 feet or more.

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LOW COST ELECTRIC THERMOSTAT — Item 2

A new, low cost electric thermostat of small, compact design—less than 3" in the longest dimension—has been developed by Robertshaw-Fulton Controls Co for use in clothes dryers, electric room heaters, unit air conditioners and other household and commercial appliances. The new "EA" thermostat also is excellent for such commercial equipment as steam and dry heat tables, glue pots, sterilizers, poultry brooders, egg washers, counter griddles, alarm systems and wrapping machines. Available in either direct acting or reverse acting types—breaking or making contact on temperature rise—and carries Underwriters Laboratory approval.

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MARKS FINISHED METAL SURFACES — Item 3

A line of Cartridge Markers employing electrolytic action to permanently mark all finished metal surfaces is being produced by the Lectroetch Co. Said to produce marks of very bold or very fine line, the Cartridge Markers may be used safely on the most precise and delicate parts, as only a kiss contact is required between the cartridge stencil and part to initiate the marking action. The manufacturer states that no stress, strain, burrs or deformation is set up in the part being marked.

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ENGINEERS' OPTICAL DESIGN KIT — Item 4

A new optical engineering experimental kit now available from Houston Technical Laboratories contains a wide selection of precision optical components. Includes a prism, cylindrical and spherical lenses, and flat, cylindrical and spherical mirrors suitable for use in all types of optical systems and devices. Kit provides a choice of 19 product-proved components offering extreme accuracy and durability in the most exacting applications. Packaged in an attractive, fitted case. All are standard items available from stock in any needed quantities.

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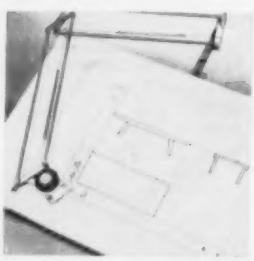
DRAFTING AIDE — Item 5



For drawing plans or scale drawings, for general drafting and commercial art work, for any graphic operation requiring a T-square and triangle, use the Walpole-Nordquist Drafting Machine. Sturdily constructed of cold-drawn steel tubing and accurately machined steel and plastic parts. Sets and holds any angle and its complement, combining all the functions of T-square, triangle, portractor and scales. The protractor head reads from 90° through 0° to 45°, with automatic quick-set lock every 15°, which takes care of ninety per cent of all angle work.

This column describes new products of general interest to professional engineers. For further information, fill in the coupon provided and mail to the AMERICAN ENGINEER.

TAPE RITE APPLICATOR — Item 6

Fast and accurate application and simplicity of operation are said to be features of the Tape Rite applicator, a new one-hand dispenser for all pressure-sensitive tapes developed by GorDag Industries, Inc. Can be used whereever masking, sealing or joining tape is required. Tape pays out of the applicator and is firmly attached to the job surface by a resilient steel "finger"; when the correct point is reached, the unit is rolled over, and the serrated edge of the "finger" cuts the tape in the desired spot.

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THUMB-SIZED MOTOR FOR AIRCRAFT — Item 7

A tiny motor, no larger than a man's thumb has been developed by General Electric Instrument Department at Lynn, Mass. It is believed to be the smallest motor currently used on aircraft. Rated at 26 volts and weighing just 1.2 ounces, it is 5/8" in diameter and 1.2" long. Its no-load speed is 21,000 RPM, and it has exceptionally high acceleration, stall torque and efficiency for its size and type. Designed to withstand ambient temperatures in the range of minus 55°C to plus 90°C when operated as a control motor, and to provide satisfactory performance at altitudes up to 60,000 feet.

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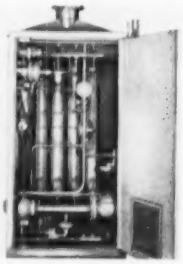
PACKAGED LP-GAS PLANTS — Item 8

Development of a self-contained, fully automatic, packaged LP-Gas plant has recently been announced by American Liquid Gas Corp. for use by industries and utilities. No outside source of power is normally required because they are entirely self-contained and are designed to operate at pressures from one to five pounds depending on the heating value of the mixed gas. The manufacturer states however, that where higher pressure mixed fuel is required, or low pressure liquid is used, electrical power may be needed for auxillary pumps.



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LIGHTWEIGHT NYLON AND VINYL TARPS — Item 9

Strength Incorporated announces "NYVEL" tarpaulins and coverings of all shapes and sizes, made from a new light-weight material which incorporates the use of nylon and vinyl plastic film. Among its many features is exceptional tear strength, easy to store, water-proof, rot and mildew-proof, with sun-fast colors. All seams are electronically *welded* and *sewn*. Electronic equipment, coupled with a new sewing development assures a completely electronically sealed and sewn tarpaulin which is kept intact in the seam. Stock-sizes up to 100 x 100 ft.

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LIGHT SEES AROUND CORNERS — Item 10

A new multi-purpose inspection light by F. T. S. Corporation is said to permit close examination of otherwise inaccessible or hard-to-see areas, bends light around corners by means of a combination light-focusing rod and magnifying mirror. Available in kit form under the trade name Syte-Ayde. Light for the Syte-Ayde is provided by a pen-sized flashlight. A detachable lucite rod transmits and focuses this light on the area being inspected. Easy viewing of the area is then possible through a magnifying mirror attached to the rod end.

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Dr. Donald A. Wilbur, shown completing the vacuum system around an experimental magnetron, received his Ph.D. in Physics from Univ. of Michigan (1932). He was Professor of Physics at Rensselaer Poly. Inst. (1933-43). Dr. Wilbur joined the *Electron Physics Section* of the G-E Research Laboratory in 1943. His research interests include traveling-wave tubes, microwave circuits and systems, and acoustics.

Rapid tuning for magnetrons

General Electric's Dr. D. A. Wilbur experiments with non-mechanical, electronic tuning methods

General Electric's interest in ultrahigh-frequency wave generators dates back to the pioneer work of Dr. Albert W. Hull, who invented the original magnetron in 1921. The subsequent role played by magnetrons in military radar is now familiar history. But until recently, tuning magnetrons over a broad range had to be accomplished mechanically; and this was a major problem, since space was limited within the vacuum envelope. Also, the required mechanical linkage made tuning a slow and cumbersome operation.

Dr. Donald A. Wilbur and his associates at the General Electric Research Laboratory have discovered how to tune magnetrons by varying the DC supply voltage. Because this method is electronic—rather than mechanical — the tuning can now be enormously speeded, permitting the use of magnetrons in many new automatic testing devices. As a result of this work by General Electric scientists, electronic tuning may soon be adapted to radar, television and radio broadcasting, and for testing the components of communications networks.

Progress Is Our Most Important Product

GENERAL ELECTRIC